AMERICAN GAS ASSOCIATION MONTHLY

Picture Commemorates First Display of Gas in America at Baltimore

Furnace Atmospheres and Steel

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R. D. LEWIS

Leaders of Industry To View Gas Exhibits When World's Fair Opens June 1

CHARLES W. PERSON

May, 1933

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1. Gas rates in effect on January 1, 1933, together with data on kind and heating value of gas supplied in practically every community in the United States and its Possessions, Canada and Newfoundland.
2. Complete list of gas companies with names of communities supplied by each company.
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World's Fair Tribute to Science

NIGHT view of South Stairway, Hall of Science Court at A Century of Progress Exposition. Recent advances in illumination now make it possible to enrich architectural designs with indirect, non-glaring lighting effects. The walls of the building are bathed in great masses of vivid reds, blues and yellows.

AMERICAN GAS ASSOCIATION MONTHLY

Allyn B. Tunis, Editor

VOLUME XV | MAY, 1933 | NUMBER 5

Picture Commemorates First Display of Gas in America

Alexander Forward

COMMEMORATING the first public display of gas lighting in the United States, which took place in 1816 in Peale's Museum, Baltimore, Md., a group of individuals, associations and companies in various parts of the country, collaborated in having a suitable memorial prepared; a painting depicting this event, which has been placed in the Municipal Museum. The Baltimore committee which had charge of this commission was composed of Dr. Wilbert J. Huff, of Johns Hopkins University, and Charles C. Krausse, of The Consolidated Gas Electric Light and Power Company of Baltimore.

To mark the hanging of the canvas, Alexander Forward, managing director of the American Gas Association, addressed a group of friends of the Museum at the unveiling, which took place April 28. The ceremony was held in the same room in which occurred Rembrandt Peale's demonstration and exhibition.

"By reason of Rembrandt Peale's display of the new illuminant in this very building, he was largely instrumental in giving Baltimore the honor of having the first gas company in this country," Major Forward told his audience. "Following the issuance of the municipal ordinance on June 17, 1816, the company was incorporated early the following year—February 5, 1817—Rembrandt Peale being named among its founders.

"I can assure you that its memory and the historic interest in the part it played when the gas light was aborning occupy an important place in the archives of the gas industry," the speaker added. Continuing, he said:

"It therefore seems singularly fitting, so many years after Rembrandt Peale advertised, June 13, 1816, 'the gas lights by which my saloon of paintings is now illuminated' that we should be gathered together to unveil these commemorative paintings. They speak for themselves and portray with artistry and fidelity the genesis and growth of an industry today furnishing continuous and essential service to nearly sixteen million customers in home, business and factory.

"Before my title, 'The Early History of Gas in America' was assigned, I had thought of 'Light in Dark Places.' I think they might well be combined for when man began to develop and enjoy the resources of this planet, he found himself in a world of beauty by day but plunged in impenetrable darkness by night. It is true of course that twilight provided a kind of no-man's land to bridge the otherwise abrupt gap, and that the moon and the stars, when unobscured, served to more than 'make darkness visible.' But the *genus homo* does not possess the animal ability of seeing readily in the dark and he was irked at the loss of so many precious hours. Characteristically he set to work to improve upon nature and provide substitutes for the apparent oversight. Nothing has ever been too great and nothing too small for his ambition. His tastes have been catholic and all-embracing, from improving on nature by advertising billboards on the beautiful hills to ointments and lotions for feminine pulchritude—gilding the lily, as it were.

Result of Long Study

"The most commonly used early substitutes for daylight, and very crude and inefficient most of them must have been, were flaming torches, whale oil lamps, candles and kerosene oil lamps. Cleaning and trimming, the necessity for keeping fuel supplies on hand, together with smoke and offensive combustion odors, along with a very definite fire hazard all served to create a growing demand for a superior lighting service. Conditions were ripe for prompt acceptance of such an agent; in the little Cornish town of Redruth

The painting, in the form of an over-mantel decoration, was executed by R. McGill Mackall of Baltimore. It is in three panels, with the large central painting portraying Rembrandt Peale exhibiting gas lighting as a curiosity which illuminated his saloon of paintings. This exhibition in 1816 drew thousands of interested spectators, and the public approval led to the formation of the first gas lighting company in America

Old records were searched to ascertain the appearance of the original lighting fixture and the costumes of Baltimore of that day. The lights in regular intervals were borne on a large ring suspended from the ceiling, which was referred to as a "ring beset with gems of light" in Peale's advertisements of that day

destiny had marked the creator of a new industry. Harking back to one of our much told stories, there in 1792 William Murdoch experimenting with gas made by distilling bituminous coal, attempted to cap a gas flame with his wife's thimble. Punctured with many small holes from the eye of the sewing needle a simple but effective illuminating flame resulted. In appearance it resembled the inverted claw of a game cock and served as a model for the first gas burner, known as the cock-spur burner. Light was obtained from hot luminous particles of carbon which in turn were derived from the decomposition of the rather complex hydrocarbon gases of which gas made from coal largely consists.

"For nearly two hundred years prior to the momentous application made by Murdoch, the alchemists, pseudo-scientists and great research workers of the day had given much of their time to studying the production of flame. In the light of the knowledge we now have, as compared with the paucity of their information regarding the various sciences it is clear that Murdoch, along with his immediate predecessors and contemporaries were great technicians as well as men of vision. Of that illustrious company of men of genius, van Helmont, the Belgian, gave our product its name 'gas' in 1609; Boyle enunciated his law of gases in 1662, and Dr. Clayton, the English minister, made gas from bituminous coal in 1665. Cavendish, Lavoisier, Priestley, of oxygen fame—also the inventor of our gas water seal—and many others contributed largely to the sound foundation on which the gas industry is built.

"Samuel Clegg, in 1815, introduced one of the greatest adjuncts of the gas industry, the meter, which, comic section popular opinion notwithstanding, continues to be one of the most amazingly accurate and reliable self-operating devices. It can only function when gas is actually passing through it and you will observe was invented just one year before Rembrandt Peale's public demonstration. Seventeen years later the first gas meter factory in America was started by Samuel Hill. Where? Why in Baltimore of course!

"In almost every case the records of well-operated and successful gas companies are inseparably bound up with the development of the communities they serve, and Baltimore is no exception, but rather a shining example. The Consolidated Gas Electric Light and Power Company of Baltimore and its antecedents have been in the service of the people of this City since 1816 and its beginning antedated the steam railroad, electricity, the telegraph and the telephone.

"The first trade journal of the American gas industry reported in its first number, published July 1, 1859, that under the presidency of Columbus O'Donnell, the Baltimore Company had a total length of mains amounting to 65 miles, 8200 customers and 1800 public lamps.

"Without High-Falutin' Sophistry"

"For the year ending December 31, 1932, the report of stewardship of the present company's responsible officers, Messrs. Aldred, Wagner, Cohn, Clarke and Schmidt, presents an interesting comparison over the intervening seventy-three years. The miles of main have increased from 65 to 1412 and the gas customers from 8200 to 195,-087. For almost a quarter of a century this remarkable quintette of executives has successfully directed the affairs of the oldest company in our country, and by their works they are known. Of the present-day activities it might well be said what was editorially remarked in May, 1860:

"'The report is a straightforward, square-toed document, without any high-falutin' sophistry to befog the reader, and commends itself to the entire confidence of their customers.'

"Here it might prove interesting, and perhaps profitable, to turn back a few pages of history and examine world-wide conditions as well as those of the embryo gas industry in 1816. In Europe we find—

" 'An era of peace and reconstruction had begun; that after a generation of war and turmoil France had started on her new career of parliamentary government. The final settlement of Napoleon's great upheaval of Europe left England feverish and exhausted. The prolonged financial strain of twenty years of war had saddled Great Britain with a national debt of eight hundred million pounds. Of material gain there was little to show.

" 'The pressure of the heavy taxes required to meet the financial legacies of the war was embittered by the general distress of the country.' Taxes on grain importation resulted in famine prices and 'corresponding tariff restrictions abroad kept British markets over-stocked with goods.'

" 'Mills and factories had to be shut down, while at the same time the labor market was glutted with several hundred thousand discharged sailors and soldiers.

" 'In America the depression of commerce and industry resulting from the war with England remained unabated. To relieve the situation the Secretary of the Treasury, A. J. Dallas, proposed as a measure of relief, the chartering of a new national bank with increased capital and enlarged powers and the readjustment of the tariff by the imposition of higher duties. The bank was chartered for twenty-one years with a capital of 35 million dollars, a portion of the stock to be owned by the government and the institution to have in its management five government directors in a board of twenty-five. Late in the year Indiana was admitted as the nineteenth state."

"So much for a brief glimpse of the international picture in 1816.

"Toward the close of the eighteenth century numerous developments occurred in many countries and widely separated cities whereby the possibilities of manufactured gas became better known. Today we probably would classify many as experimental installations; most of them were for individual applications to homes and factories. Winsor in England, LeBon in France and David Melville in the United States were among the earliest who had a definite hand in promoting the new project. In London, for example, Winsor gave a public display of gas lighting at the Lyceum Theatre in 1804; David Melville of Newport, Rhode Island, appears to be the first to have manufactured gas for illuminating purposes in this country. He lighted his home and the street in front in 1806.

Experiment Carefully Watched

"The great lighting experiment in Baltimore was carefully watched by other communities which eventually followed suit a few years later, Boston and New York being next in order. As an illuminant for street and home lighting gas speedily found itself passing from the novelty and luxury stage to that of a necessity and so another great public utility service came into being. For many years various forms of open flame burners were employed, functioning on the same general principle of the cockspur discovered by Murdoch. Next came the gas Argand, a circular burner modeled on the oil Argand. Later, the industry adopted a revolutionary development in lighting when Bunsen's blue flame burner with Auer's mantle attached became available. About 1890 what was later known as the Welsbach Incandescent Mantle Burner came along at the psychological moment to strengthen the hands of an established lighting industry just beginning to feel the competition of Edison's new electric light. A few years later the inverted shadowless mantle burner was introduced to assist in meeting, for a time, the seemingly irresistible progress of the electric light.

"There are some who do not concede that gas for lighting has had its day and in many a large European city modern high-pressure incandescent gas street lighting is a joy to behold and of economic interest to its users. But, however that may be, the use of gas as a heating agent in the Bunsen burner to raise to incandescence the rare earths (which glow when heated) of Auer's mantle, gave added impetus to the use of gas as a fuel. The unit of heat became more important than the measure of light, and candle-power gave way to the B.t.u. Other applications of the new fuel, in addition to lighting, were speedily made, notably that of cooking. As early as 1849 a Mr. Ricketts registered the Economic Gas Cooking Stove with which, it was claimed, a large family 'might provide themselves with fuel for roasting, boiling, stewing, and broiling, at all hours, without the waste of having to maintain a large coal fire constantly burning.' The commentator went on to remark 'we hope at no distant time to see a gas cooking stove and gas fittings, as landlords' fixtures in the humble dwellings of the working population of our cities and towns, as well as contributing to the comforts of the mansions of the rich.'

"One earnest inquirer in 1859 sought information concerning the cooking of a whole ox by gas. He was advised that 'while it was unusual it was not without precedent in that a monster joint weighing 535 pounds was cooked (1850) in England on a dripping pan environed with brick and surrounded with 216 jets of gas and covered with sheet iron.' It took five hours to roast; to cook this piece of beef, he was advised, by an ordinary fire would have taken fourteen hours, 'a startling fact for hotel keepers to consider.'

"Having briefly glanced at the proposed use of gas for the sustenance and pleasure of the inner man as envisioned by the pioneers, it is interesting to know that they did not overlook his bodily comfort. Frederick Accum was an English 'Operative Chemist' who, in 1815, wrote a treatise on gas light. He remarked, 'from trials made on the subject I am enabled to state that three Argand's lamps consuming five cubic feet of gas per hour, are sufficient to keep a room 10 feet square at a temperature of 55° Fahrenheit when the air without doors has a temperature of freezing.'

"Now I am afraid that a twenty-three degree rise in temperature, even in a 10-foot room will not appeal to those accustomed to demanding a home temperature of 70° and up, from zero and below outside, nevertheless it was a beginning. According to old records many others early foresaw the use of gas for both incidental and central space heating. Even Winsor, who was also the industry's first promoter, included claims in his patent for room heating. Other inventions a few years later incorporated fundamentally sound principles, as for example, the circulation of gas-heated air currents in 1833; sufficient interest was aroused to warrant starting a gas heating equipment factory in England. However, no really great advances were made

here until about 1880 when American gas men began to report successful trial installations for both manufactured and natural gas. Progress was relatively slow until better equipment was designed and among the 'other enterprising companies leading the way and showing what can be done' as reported in 1923, that of Baltimore was included.

Baltimore First Again

"Today, gas automatically maintains desired temperature conditions in thousands of homes, and in addition may keep the summer air cooled and in just the right condition of humidity for maximum personal comfort. The latter is another 'Baltimore first' activity; in the spring of 1929 there was placed, in another place of public assembly, a theatre in McKeesport, Pennsylvania, a summer air-conditioning installation. The equipment was designed and manufactured in Baltimore and gas is the source of energy which automatically brings coolness and comfort to satisfied audiences.

"It will be observed that when gas was first manufactured it was introduced as an illuminant and that next it was found practicable for use as a fuel for cooking and then came its application to space and central house heating. But there is still another and very important use whereby gas found another logical place and that curiously enough was reported about a year before the occasion we are celebrating tonight. I refer to the use of gas in industry as a source of automatically controlled heat, smokeless and requiring no storage.

"From small and simple beginnings has grown an enormous industry serving the peoples of practically all civilized countries. Last year according to the preliminary estimates, the manufactured gas companies in this country alone sold 372,208,100,000 cubic feet of gas for use in the home and industry, with a value of $411,750,300.

"Everybody knows that in addition to coal gas and carburetted water gas there are now available vast quantities of natural gas in various parts of our country. Modern engineering methods have made practicable the transmission of natural gas from sources of supply frequently many hundreds of miles away from its possible utilization, thus bringing this valuable fuel into the cities of many states. Economics determine in each locality whether it is best to make or import gas.

"It may be distributed to the customers of the gas companies alone or mixed with manufactured gas. In 1932, according to the preliminary estimates, the total sales of manufactured and natural gas in this country amounted to approximately 1,748,000,000,000 cubic feet; the revenue received amounted to over 754 million dollars ($754,280,300).

"It must not be assumed however, from the growth indicated by the figures I have quoted, that the gas industry arrived at its present position by a fortuitous combination of circumstances. Just as its first uses were in direct competition with established sources of light, heat and power, so has it continuously had to meet various forms of competition. In passing, permit me to invite your attention to the fact that I just referred to gas for power. Even before gas was well-known the internal combustion engine was designed; the phenomenon of power produced by the controlled and properly directed explosion of the air-gas mixture was promptly applied.

"Here gas gave battle to the steam engine in much the same manner as the electric motor later joined issue with the gas engine. Many large gas engines are used today, notably in the compressor stations along the lines of the cross-country pipe systems which convey natural gas great distances.

Succeeds Against Rivals

"The gas industry has seen about as many and complete changes as any industry can experience, and has adapted itself to all of them. In addition to endeavoring to meet the situation euphemistically known as 'competition for the customer's dollar' it is faced with the efforts of other fuels in the home and in industry. Numbered within these ranks are both the old and the newer fuels, arrayed in solid but unjoined front. The gas industry must perforce meet in strenuous combat the claims of hard and soft coal, largely augmented by automatic equipment, such as producer gas plants for industry, and stokers for the home as well as for the factory. There is also the very aggressive attack of the oil burner, again in the factory and the home, as well as that of other liquids which are readily and simply converted into gases of high heating value. Even our erstwhile competitor, and later sister industry, electricity, is after some of our business. But the gas industry, with great unanimity of purpose and singleness of mind, presses forward, secure in the faith that its cause is founded upon the soundest of fundamentals. The highly efficient conversion of its raw materials, which are the nation's natural resources, to a clean and smokeless fuel; its continuous distribution right into the customer's home and factory without necessity for advance ordering or storage, are great assets. So too is its ease of control, manual or automatic as may be desired. Aided by clear thinking, advertising and sound merchandising principles, this great industry has succeeded not only in meeting many competitive attacks, one of which threatened its very continuance, but has more than met the greatest crisis this country has ever known.

"Among its handmaidens is that which gave it birth—Research. Research in production processes, in distribution materials and methods, in utilization and in rate making, these and many others, all have played a most important part. Two such developments are of popular interest and immediate appeal, and one, air conditioning, I have already mentioned. The other is freezing by means of a tiny gas flame; an experiment but a few years ago, and now in continuous operation in thousands of domestic and commercial refrigerators.

"All of this has occurred in an industry regulated by governmental authorities exercising jurisdiction over practically all phases of the business, including the rate of return and hence the cost to the consumer. Very few of the competitors of the gas industry have any regulation other than that which is self-imposed or the result of the natural laws of supply and demand.

"On behalf of the gas industry in this country, I pay my tribute to the City of Baltimore, the Cradle of the American Gas Industry."

Effect of Earthquake On Southern California Gas Systems

Photograph No. 1
View of State Highway a few miles north of Newport Beach, showing earth displacement

By Arthur F. Bridge

Vice-President in Charge of Operations
Southern Counties Gas Company of Calif.

SINCE history clearly demonstrates that California is subject to earthquakes at irregular and infrequent intervals, gas men are interested in the ability of their transmission and distribution systems to withstand such shocks.

Seismologists state that the relative intensity of the quake of March 10-11, 1933, is indicated by a figure of eight in an arbitrary scale having a maximum of twelve, the scale being based on observed effects.

The epicenter of the earth movement has been located on a southerly prolongation of the Inglewood fault at a point in the ocean bed about three miles southwest of Newport Beach.

The cities of Compton, Long Beach, and Seal Beach suffered the greatest structural damage and accompanying casualties, presumably because they are built on an alluvial deposit of great depth.

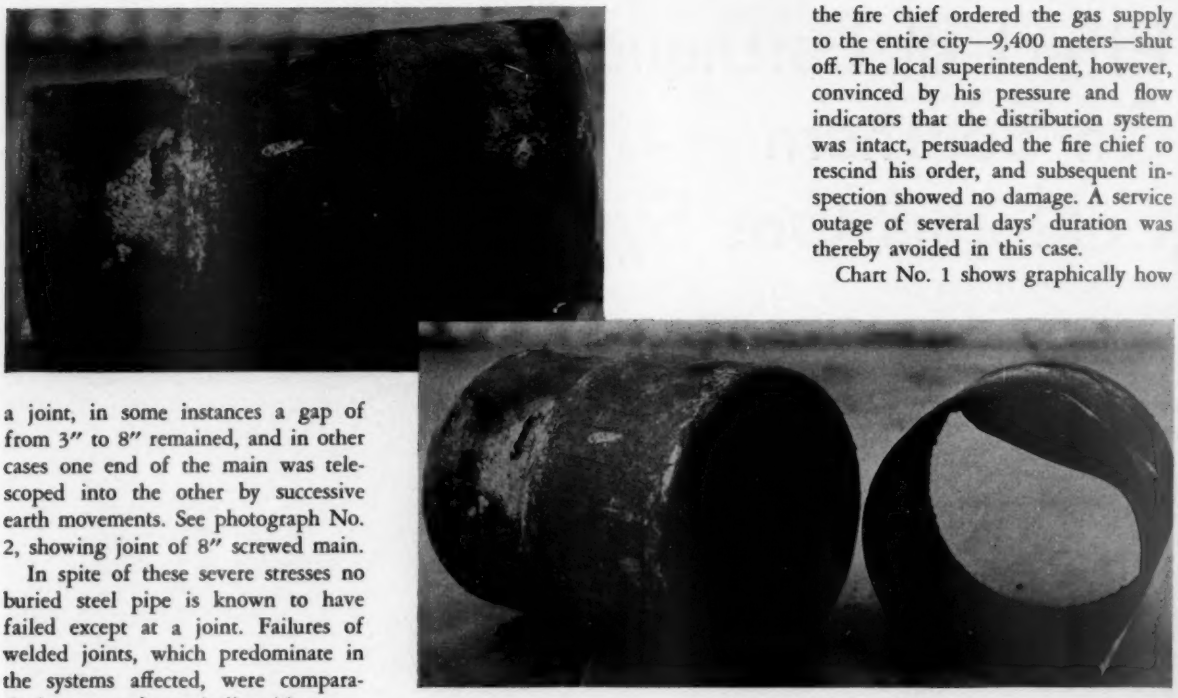
A circle drawn with Long Beach as a center, with a forty-mile radius, includes roughly the area affected by the shock, while severe damage was confined to a fourteen-mile-wide strip adjacent to the coast line and extending from San Pedro to Laguna Beach.

The total value of gas property in the large area mentioned above is approximately $124,000,000 and it was damaged to the extent of about $132,000, or 0.1%. The gas system in Long Beach, which is the only large city in the heavily damaged area, is valued at $6,000,000, and physical damage amounting to about $80,000 was suffered. The above figures exclude loss of revenue. There are approximately 696,000 gas meters in the larger area, of which some 71,000 were shut off for periods ranging from a few hours to eighteen days.

The following commentary presents in condensed form the opinions and observations of several gas engineers who supervised the repair work and restoration of service. Damage to buildings and similar structures has been fully described in various publications, hence will be referred to very briefly herein.

As might be expected, screwed joints and malleable iron fittings proved to be a source of weakness and together accounted for most of the leaks in both mains and services. Corporation cocks used at the service connection to the main were found to be a particularly weak link and a great many were broken, usually where threaded into the main fitting. In recent years screwed joints and fittings have been practically eliminated from local underground gas systems and superseded by all-welded or brazed construction.

Pipe systems in the area of intense shock were undoubtedly subjected to considerable strain, as evidenced by the fact that where mains ruptured at



Photograph No. 2
Views of 8-inch joint from transmission main on Perris Road, Long Beach

a joint, in some instances a gap of from 3″ to 8″ remained, and in other cases one end of the main was telescoped into the other by successive earth movements. See photograph No. 2, showing joint of 8″ screwed main.

In spite of these severe stresses no buried steel pipe is known to have failed except at a joint. Failures of welded joints, which predominate in the systems affected, were comparatively rare, and practically without exception those which did fracture showed evidence of defective workmanship, usually lack of penetration. No failures occurred in welds designed to develop the full strength of the pipe.

An illustration of the last statement is given in photograph No. 1, which shows a section of the Coast Highway near Newport Beach. A 12¾″ welded steel main supplying gas to San Diego underlies the shattered roadway in the foreground, and although displaced vertically and laterally about 2½′, was undamaged.

No damage to cast iron gas mains was observed, although the footage of cast iron is relatively very small. However, in a dredged fill in East Long Beach, where considerable ground displacement occurred and where the effect on all types of structures was unusually severe, cast iron water mains were fractured.

Most of the breaks in the distribution systems were in service lines, and these were usually caused by movement of the house. Many small houses in the affected area were of the "ready-cut" type with unbraced underpinning, and consequently these houses rocked on the underpinning until they toppled off their foundations. In such cases the service risers, attached to the house through the meter, acted as a lever and broke the screw ell or tee at the bottom of the riser.

A considerable number of meters—about 900—were damaged or destroyed where buildings either collapsed or skidded off their foundations as described above, and in most cases the tube screws were torn loose from the meter cases. The advantages of curb-meter construction under such conditions are evident, as these were not subjected to the stresses resulting from direct attachment to house piping.

Photograph No. 3 shows a fallen parapet wall in Santa Ana, part of which struck a double curb-meter vault —indicated by arrow—and drove it downward 8″ without injury to the meters or service.

There was no damage to holders except bending of a few goose-neck roller brackets on a telescopic holder at Long Beach. Vertical high-pressure holders at San Pedro and Santa Ana were unaffected.

Men in charge of some of the cities in the severely shaken areas were obliged to make quick and important decisions. At Santa Ana, where much damage was done to business buildings, the fire chief ordered the gas supply to the entire city—9,400 meters—shut off. The local superintendent, however, convinced by his pressure and flow indicators that the distribution system was intact, persuaded the fire chief to rescind his order, and subsequent inspection showed no damage. A service outage of several days' duration was thereby avoided in this case.

Chart No. 1 shows graphically how a standby high-pressure holder prevented a service interruption at Newport Beach. At 5:45 P.M. the holder was practically full—110 M cu.ft.—and the entire load was carried on the 4″ transmission main supplying the town. The first shock ruptured a 3″ gate valve connected directly to the transmission main, thus rendering it inoperative. As the chart shows, the holder automatically picked up the load and carried it until the pipe line was repaired temporarily, at 10 P.M.

A major service interruption occurred at Long Beach, where 46,000 meters were shut off and service was not completely restored until March 28. The distribution system consists of 385 miles of distributors and 25 miles of trunk lines, operating at about 5 lbs. and 30 lbs. respectively. Welded steel construction predominates, with some cast iron and screwed steel mains in the older part of the system. Service lines are steel with screwed malleable fittings.

Fortunately there were several breaks in a 20″ trunk line, which, together with shutting off the supply lines, dropped the pressure to zero in a few minutes after the first shock.

Photograph No. 3
Fallen Parapet wall over curb meter vault in Santa Ana

The first big job was to shut off all meters, which was immediately undertaken, required about 3000 man-hours, and was completed March 14.

Tests for leakage, and repair of breaks were carried on simultaneously, employing a total of 400 men. The distribution system was divided into 33 sections, which were isolated by cutting and blanking off mains, installing valves, and closing those which existed. When isolation of a section was effected, gas, odorized to the extent of 11 gallons of Calodorant per million —five times normal concentration— was fed in through a large displacement meter. With consumers' meters shut off, the volume of leakage was indicated by the meter, and the odorant disclosed the location of leaks.

The search for leaks, and the repair work were continued in each section until leakage had been reduced approximately to normal. Consumers' meters were then turned on and meters, regulators and houselines checked. House line repairs were made by plumbers. All of this work was performed without serious accident or fire loss. The odorant proved extremely useful in locating leaks, and gas detectors were used to advantage in getting a final check on all manholes and building basements.

The following Long Beach statistics are interesting:

	Approximately
Houses shaken off foundations	2,200
Meters damaged or destroyed	515
Services broken at riser	1,650
Services sheared off at main or broken at joints	1,000

Gas is used practically exclusively in Southern California homes for cooking, space and water heating, consequently the discontinuance of service caused considerable inconvenience. In a number of cases hospitals, restaurants, newspapers, and similar establishments were supplied during the shut-down with liquefied gas. Petroleum coke was distributed in considerable quantities by an oil refining company, and used in improvised outdoor stoves and fireplaces.

A great deal of difficulty was experienced in conducting the shut-off leakage tests because many consumers insisted on turning on their own gas while the tests were in progress, and their consumption registered as leakage. Appeals to the consumers by radio and newspaper were resorted to and in some cases a number of men patrolled the test area to prevent unauthorized turn-ons.

In Seal Beach, where the shock was very intense, and both water and gas systems were shattered, the city officials refused to allow the gas company to reintroduce gas until all water lines were repaired. This would have delayed the restoration of gas service by a week or more, so highly odorized air was employed for leak detection, with complete success. Portable compressors were used and the gas system was ready for service before the water main repairs were completed. Except for the slight delay involved in final purging with gas, this method is preferable to testing with gas, because it avoids the possibility of explosion and fire resulting from undetected leakage into vaults and buildings from breaks in the underground system under test. However, this method involves the remote possibility of igniting an explosive mixture in the mains, hence its use should be restricted to systems which do not contain large cast-iron mains incapable of withstanding the pressures developed by such detonation. It would be entirely safe for most distribution systems in Southern California.

The following general conclusions may be reached from study of earthquake effects:

Modern welded underground construction with 100 per cent joint efficiency, which can be assured by

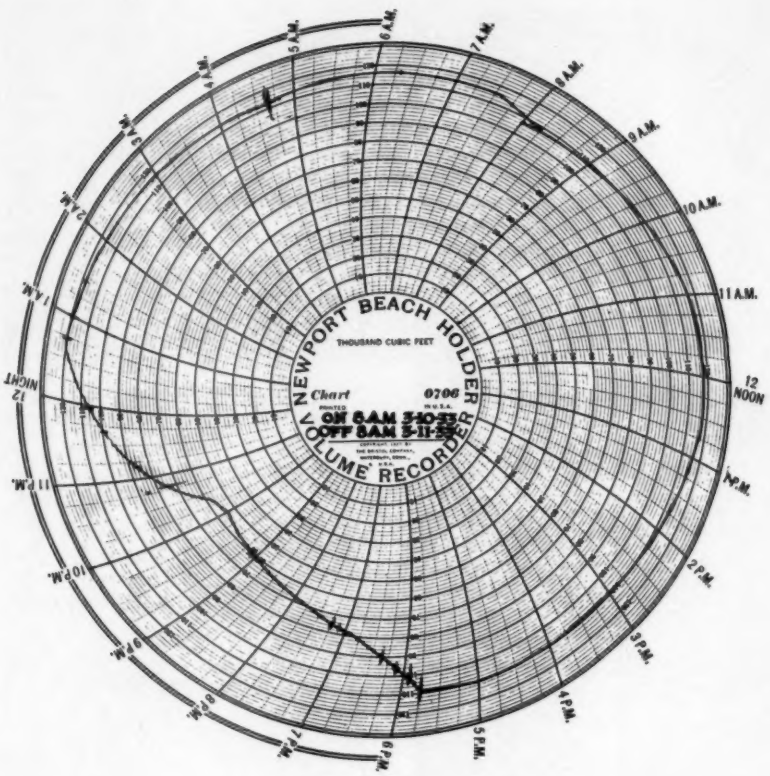


Chart No. 1
Newport Beach Holder Station. Volume chart

proper instruction and inspection of welders, is quite adequate to withstand stresses resulting from earth shocks of the severity experienced.

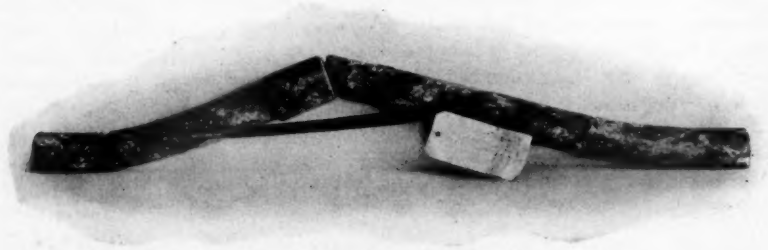
Screwed joints and fittings should be minimized and preferably eliminated in all distribution construction up to and including the service riser.

Curb type meters are practically immune to the damage experienced with the above-ground meter installation, and their use eliminates the hazard due to escape of gas into a house from a broken meter. Where use of curb meters is not feasible for economic or other reasons, the service riser and meter should *always* be outside the building.

The distribution system should be sectionalized—sections 2000 meters or less—by valves designed to insure a tight shut-off.

A great deal of trouble and delay were experienced due to failure of gate-valves to provide a tight shut-off.

Men trained in organizing and supervising leakage mitigation work are best qualified to handle testing and service restoration after an earthquake.



Effect of the earthquake graphically shown here

That portion of the pipe to the right of the coupler shows a portion of a 100-ft. section of pipe which had been bent upward in the fashion shown and at the same time sheared off 14 services. The section to the left, to which the coupler is attached, pulled an 80-ft. section of pipe, shearing off 11 services. This section was removed from a 2-inch main in Compton. The small pipe attached to either side of the section is attached merely to hold it in shape

Gas Company Employee Recognized for Heroism

C. H. Leutner

CHARLES H. LEUTNER, an employee in the gas distribution department of the Consolidated Gas Electric Light and Power Company of Baltimore, has been selected as the recipient of an award offered by an anonymous "Citizen" of the Maryland City for conspicuous heroism. The award is made each year through *The Sun*, one of Baltimore's oldest daily newspapers.

For years these awards have been made in recognition of exceptional actions in the Police Department, Fire Department, the Street Railway System and the Gas and Electric Company of Baltimore.

Mr. Leutner was selected because of his alertness and persistence which resulted in the resuscitation of a woman who had been overcome by gas which had entered her home from a leak caused by a broken main in the street. Mr. Leutner has been with the Consolidated Company for twenty-eight years, and is one of its valued employees.

"Wolf in the Basement"

One of the meter men of the Capital Gas & Electric Co. in Topeka, Kansas, recently went to remove a meter in a house on Walker Street. Removing the meter, however, wasn't an easy job. The meter man in the space provided under "Remarks" on the report he made, wrote the following: "Wolf in basement—can't get to meter." So the following story sent in from the Topeka company is published in "Gas Service," March 15:

"In this period of depression most people find it hard to keep the wolf from the door. In fact, circumstances were so bad in one case in Topeka that it was necessary to remove a gas meter because of the wolf in the basement. We hope things don't get much worse."

Energetic Campaign To Make Housewives Conscious of Gas Economy

By R. D. Lewis

Director of Publicity and Advertising, The Laclede Gas Light Co., St. Louis, Mo.

CONSIDERABLE has been said about new and unusual conditions and a form of competition which is threatening the backbone of the gas industry—the domestic cooking load. But as Hathi, the wise elephant, said to Mowgli during the great drought, "These things have happened before."

It would be well, even if it were not necessary, for an industry that has so long dominated a field, as the gas industry has dominated the domestic cooking load, to occasionally look at itself from a distance. Then there is always the question of whether the industry merely has been trying to keep alive a demand for a product in a field that has been worked for more than half a century, or is actually competing for existing markets.

Probably no other field has been so actively worked and so completely dominated, as far as the domestic cooking load is concerned, as that served by The Laclede Gas Light Company. Being among the first of the central stations to enter the merchandising field, it has contributed its share to the 15,000,000 gas ranges now in use in the United States. Being confined to the corporate limits of the city by the city charter and the franchise, it is not permitted to follow the growth into suburban territory, but must confine its efforts to a field where saturation might be considered a figure to be dealt with. But this effects a merchandising problem and the problem at hand concerns itself with maintaining and promoting the gas cooking load.

The situation involves a shift of perspective to find out just why gas is superior to competitive fuels and impart that information to the prospective consumer. In that way we find new markets by studying the latent and potential needs of the customer and the industry thus gives attention to competitive products which it regards as something to be bettered.

The demand for any article does not depend so much on its novelty alone as the extent to which it can be adapted to constantly changing social and economic conditions. In the latter, gas companies may find a panacea.

As a commodity gas is little different from what it was when first distributed for public service, except its change from a candle power rating to a B.t.u. rating. But it is doubtful if the public accepts gas as a commodity. It accepts gas as a service and takes it for granted as long as there is no interruption, and there are few interruptions these days with our improved facilities.

Therefore, in order to create a con-

sciousness in the minds of the housewives in St. Louis, and an appreciation for the economy and efficiency of the direct flame method of heating, The Laclede Gas Light Company cooperates to the fullest extent with promotional cooking schools conducted by the daily newspapers in the city.

Three such schools were held during the fall and winter with a total attendance of 42,000 women. All schools were conducted from the stages of leading motion picture theatres. Two were held in cooperation with daily newspapers, one a morning and one an afternoon paper, while the third was sponsored by one of the local radio stations.

During the period of the schools each newspaper carried 2,500 lines of advertising, while the radio school was publicized by spot announcements for a period of twenty days prior to the stage demonstrations.

Most of these advertisements were of a promotional nature built around the gas range and its improvements, but never losing sight of the fact that gas service was equal to any known cooking fuel, as attested by the fact that more than 15,000,000 housewives were using it today. In practically every instance we quoted the home economics expert on the subject of gas, its flexibility, economy and speed.

It has been found that women are more practical than most men are led to believe. When it comes to wearing apparel she might display some feminine sentiment, but when it comes to buying shorts for her husband or kitchen ranges or a mechanical refrigerator she immediately becomes practical. She wants style in her kitchen, of course, but she wants efficiency, economy, and all the modern improvements with it. That doesn't necessarily mean that she is going to throw over something that is tried and found sufficient for something else, if you can keep her sold on the idea that what she has, is as good, if not better, for its particular purpose, than the new product.

The gas doesn't need any refinement. It's the appliance that must be kept up to date. That's the visible object, but if that is pleasing to her eye and she knows that the energy that supplies the heat is economical, speedy and adaptable to most any kind of

cooking, then she well may be satisfied to keep on using her gas range.

That was the thought behind the cooking school idea of The Laclede Gas Light Company. We felt it futile to merely exhort women to buy gas ranges—a mere invitation to expenditure. Our idea was to convey the impression that gas is a refined modern fuel. We have devoted whole ads to the speed of gas cooking. "Gas heat that springs from nothing to hottest intensity," is in a sample of phrases used, Surrounding these phrases with art and typography of a modernistic trend was no accident.

Range advertising should have either human interest appeal, be entertaining, or have sufficient news value to attract the attention of the housewife.

(Continued on page 219)

Furnace Atmospheres and Steel

By Clair Upthegrove

Professor of Metallurgical Engineering, Department of Engineering Research, University of Michigan

THE heating of steel preparatory to hot working or in the carrying out of heat treating operations involves the setting up of conditions which may result in a reaction between the steel and the furnace atmosphere. These conditions may exist not only at the time the metal is being subjected to the heating operation, but also during a part of the cooling operation. The product of these reactions may be a source of metal loss, of increased handling costs, of damage to working parts, or of failure to obtain the desired results in the heat treating operations.

An appreciation of the advantages which would accrue from a better understanding of the reactions which may occur between the steel and the furnace atmosphere led the Industrial Gas Research Committee of the American Gas Association to undertake fundamental investigations in this field. The studies have been in progress at the University of Michigan for several years and from time to time data obtained and conclusions drawn have been presented before various societies and in the technical press. Other investigators have interested themselves in this field and attention has been directed to the benefits to be obtained from Atmosphere Control in furnace operation. In order that information bearing on Atmosphere Control in heating of steel might be more readily available and in as simple a form as possible the fundamental facts and conclusions drawn from these studies have been brought together. No attempt has been made to enter into the theoretical discussion of the effect of the various factors. A limited amount of data has been included in the form of curves.

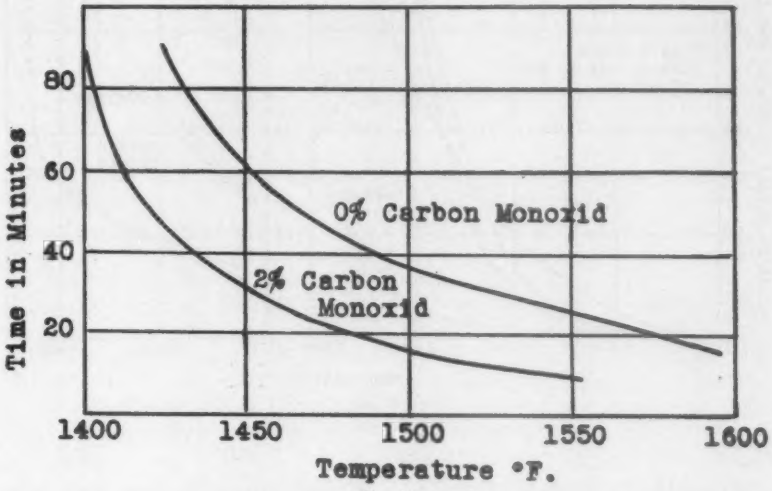


Fig. 1

Limiting temperatures and times to avoid decarburization of .85 carbon steel

Reactions of Furnace Atmospheres and Steel

The nature of the furnace atmosphere in the fuel-fired furnace will be affected by a number of factors. The most important of these are indicated below.

a. The design of the furnace permits or does not permit the combusted gases to enter the heating chamber proper.

b. The design and operation of the furnace does or does not permit the combustion gases to reach equilibrium before contact is made with the steel.

c. Gases other than for the purpose of combustion are introduced into the heating chamber proper.

d. The nature or composition of the fuel may be varied.

e. The fuel and air ratio may be varied.

Depending upon the variations in the nature of the furnace atmosphere, the metal and of the temperature, reactions between the metal and the furnace atmosphere may occur. These reactions may result in:

a. An increase in the percentage of carbon at the surface of the steel, or the steel is carburized.

b. A decrease in or the complete removal of the carbon at the surface of the steel, or the steel is decarburized.

c. An oxidation of the metal with a consequent loss of metal, or the metal is scaled.

d. An absorption of elements other than carbon in the furnace atmosphere as sulfur or nitrogen.

The condition of the furnace atmosphere, the steel and the temperature may be such that no reaction occurs and the steel and the furnace atmosphere remain unchanged.

Furnace Atmospheres

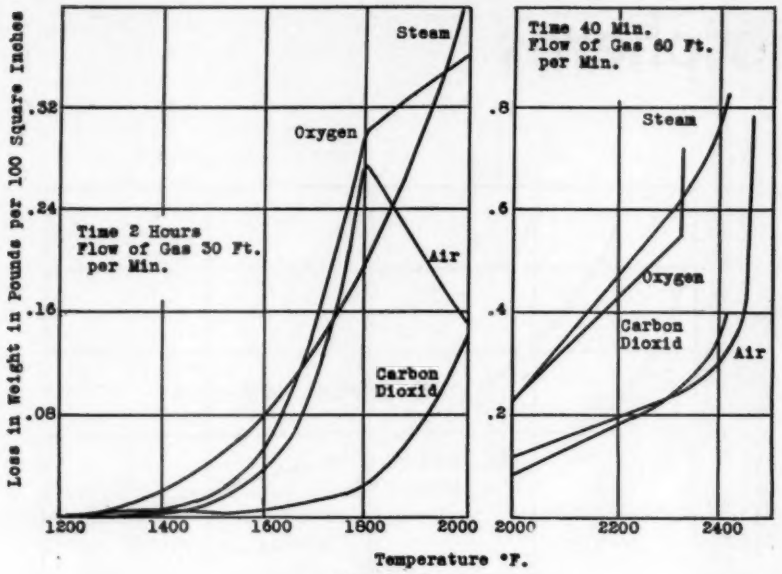
Furnace atmospheres resulting from the burning to equilibrium of public utility gas with varying amounts of air will have as their components.

a. If neither excess fuel or air are used, carbon dioxide, water vapor and nitrogen.

b. If excess air is used, carbon dioxide, water vapor, nitrogen and oxygen.

c. If excess fuel is used carbon dioxide, water vapor, nitrogen, carbon monoxide, hydrogen, and depending upon the amount of excess fuel used unburned hydrocarbons.

Oxidizing Atmospheres—Carbon dioxide, water vapor and oxygen are the oxidizing agents which may be present in the furnace atmosphere. Their activity for any given temperature is



Figs. 2 and 3
Effect of temperature on scaling of low carbon steel

determined by the extent to which they are present and the presence of diluting or opposing agents.

Reducing Atmospheres—Carbon monoxide, hydrogen and unburned hydrocarbons constitute the reducing agents which may be present in the furnace atmosphere. As with the oxidizing agents, their activity at any given temperature will be determined by the extent to which they are present and the presence of diluting or opposing agents.

Neutral Atmospheres—Neutral atmospheres are usually considered as atmospheres in which there is present neither an excess of fuel or air. Such an atmosphere must consist of carbon dioxide, water vapor and nitrogen. Both carbon dioxide and water vapor are very active oxidizing agents and as a consequence this atmosphere cannot be considered as neutral to the steel. In fact, an atmosphere carrying carbon dioxide, water vapor and nitrogen will result in active scaling of the steel and the extent of the scaling will increase with increasing proportions of water vapor. From the standpoint of the effect on the steel, a neutral atmosphere can only be one which when brought into contact with the steel undergoes no change and causes no change in the steel. Purified nitrogen will give such an atmosphere, or reducing and oxidizing agents present in such proportions that they completely nullify their individual reactions.

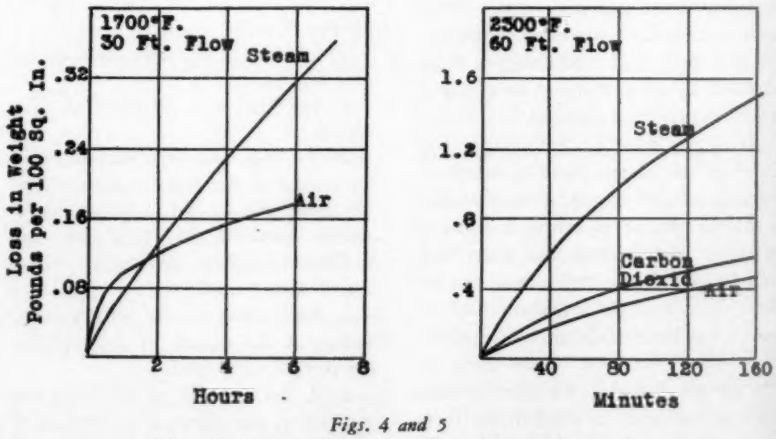
Carburization

If a steel is heated in a closed retort in the presence of a carrier of carbon to a temperature above its upper critical point, carbon will be absorbed and an outer layer of high concentration built up. This is ordinarily accomplished by packing the steel in a carburizing compound, which provides a source of carbon monoxide, or by introducing public utility gas, pentane or some other carbon carrier into the closed furnace chamber.

Decarburization

Decarburization is the partial or complete removal of the carbon from the steel at its surface. It is particularly objectionable when it occurs in heating or cooling operations that are in turn to be followed by hardening or quenching operations. If decarburization occurs in the heating preceding a quenching operation full hardening cannot be obtained and a soft skin results. If steel is decarburized preceding the nitriding operation, and this decarburized layer is not removed, a brittle case which spalls easily results.

Decarburizing Agents—Of the various gases which may be present in the furnace atmosphere moist hydrogen is the worst offender. Carbon dioxide is next to moist hydrogen. Moist hydrogen produces decarburization at temperatures as low as 1000° F. over long periods of time and at 1350° F. in one hour. Carbon dioxide also produces slight decarburization in one hour at 1350° F., but at 1550° F. the rate is much more rapid. Air and water vapor both cause slight decarburization at 1450° F. in 5 hours' time. Carbon dioxide and water vapor may be present in a 42 to 58 ratio and not produce decarburization at 1450° F. or below. At 1475° F. decarburization begins and becomes rapid at 1550° F. As moist hydrogen will be present only in reducing atmospheres, it is evident that neutral or oxidizing atmospheres must be used if its effect is to be eliminated. As the extent of the oxidizing nature of the atmosphere is increased the percentage of carbon dioxide de-



Figs. 4 and 5
Effect of variation of time on scaling of low carbon steel

creases with a subsequent decrease in decarburization.

Decarburization increases with increase in the temperature and the time but is independent of the rate of flow.

Sulfur as present in gas-fired furnaces has no effect on the decarburization.

Scale formed on steel tends to inhibit the decarburization.

Recommendations for eliminating or minimizing decarburization:

a. Decarburization may be avoided by heating in pure dry nitrogen. Tank nitrogen must be purified for oxygen and water vapor. Dry hydrogen may be used for heating for one hour at 1600° F. The use of these gases requires a muffle-type furnace.

b. Heating in a so-called neutral (neither excess air or fuel) or slightly oxidizing atmosphere may be used to minimize decarburization. A 4 per cent oxygen atmosphere will produce scale formation, but will insure heating of an .85 carbon steel for one hour at 1500° F. without decarburization. A 2 per cent carbon monoxide furnace atmosphere will cause decarburization in 10 minutes at the same temperature.

c. Formation of scale by a prequenching treatment may be used to minimize decarburization. Quenching from 1500° F. in water after a brief heating prevented further decarburization when heated for two hours at 1475° F. in a furnace atmosphere carrying 2 per cent carbon monoxide.

Scaling

Steels when heated in the presence of oxidizing agents form scale which is a source of metal loss, and unless removed presents a very objectionable factor from the standpoint of the carrying out of various operations which may necessarily follow the heating operation. The action of oxidizing agents on steel at high temperatures results in the formation of the various oxides of iron and the scale probably builds up by a mechanism wherein the iron diffuses outward and the oxygen diffuses inward.

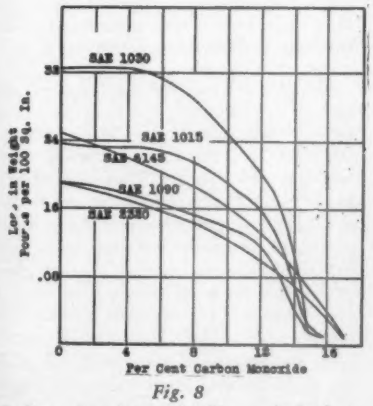
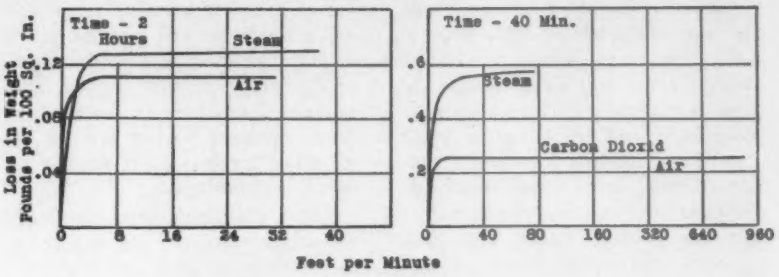


Fig. 8

Scaling of carbon and alloy steels in forty minutes in various furnace atmospheres at 2300° F.



Figs. 6 and 7

Effect of variation of gas flow on scaling of low carbon steel

Scaling Agents

The simple scaling agents are oxygen, air, water vapor and carbon dioxide. While the usual order of scaling activity is oxygen, air, water vapor, and carbon dioxide, the carbon dioxide giving the lowest rate of scaling, the order does not hold for the entire temperature range.

Temperature—At temperatures below 1200° F. the amount of scaling is very small and largely independent of the medium. Above 1400° F. scaling becomes appreciable and increases rapidly for air, oxygen, and water vapor. Carbon dioxide shows a minimum rate of scaling at approximately 1500° F. and then increases continuously. Air and oxygen, while increasing very much more rapidly than carbon dioxide at first, develop retarded scaling rates in the temperature zone 1800 to 2000° F. As a consequence above 2000° F. air and carbon dioxide have quite similar scaling rates while at 1700° F. air scales low carbon steel approximately eleven times as rapidly as carbon dioxide does. The effect of temperature on the scaling activities of a single medium usually results in a rapid increase in scaling as increasing the temperature from 1850 to 1950° F. for carbon dioxide results in a tripling of the amount scaled formed on low carbon steel in two hours. The same change in temperature in an atmosphere of air, however, results in a 25 per cent decrease in scaling in the same time.

Time—The effect of increasing the time a steel is in contact with the scaling medium is to increase the amount of scale formed. Usually the amount of scaling increases very rapidly at first and then more slowly as the time increases. This effect is more pronounced with air than with carbon dioxide or steam.

Rate of Flow—The rate of flow of the scaling medium past the steel is a factor in the rate of scaling only if very low rates are used. At 2300° F. the scaling is independent of the rate of flow of carbon dioxide and air for rates above 10 feet per minute, and above 30 feet for water vapor. At 1700° F. the rate of scaling is independent of the rate of flow of carbon dioxide, water vapor and air if the velocity exceeds 5 feet per minute.

Diluting Agents—The activities of the various scaling agents are all reduced by the presence of nitrogen. Except for water vapor a relatively high percentage of nitrogen is required to bring about any large reduction in scaling as is indicated by the relative scaling effects of oxygen and air.

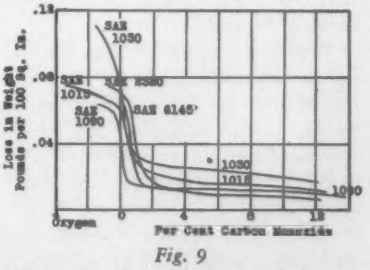


Fig. 9

Scaling of carbon and alloy steels in sixty minutes in various furnace atmospheres at 1700° F.

Carbon monoxide, hydrogen, methane and other hydrocarbons may be used to reduce the scaling activities of carbon dioxide and water vapor. The amount required will depend upon the temperature and the extent to which it is desired to eliminate scaling. Carbon dioxide and carbon monoxide mixtures in contact with steel may or may not produce scaling depending upon the steel and the relative proportions. In the same way mixtures of water vapor and hydrogen may or may not produce scaling.

A 43:57 H_2O:H_2 mixture will not scale at 2462° F. but a 46:54 H_2O:H_2 mixture will produce scaling. A 20:80 CO_2:CO mixture will not scale at the same temperature, but a 24:76 CO_2:CO mixture will produce scale. As the temperature is raised or lowered from 2462° F. a higher percentage of hydrogen will be required to give non-scaling mixtures. With carbon monoxide the percentage required for non-scaling mixtures decreases with decreasing temperatures. It is evident that with reducing combustion atmospheres mixtures of carbon monoxide and carbon dioxide and of hydrogen and water vapor capable of approaching non-scaling conditions should be obtained.

Combustion Atmospheres

The scaling of steels in combustion atmospheres is influenced mainly by the character of the furnace atmosphere, the temperature and the time.

Temperature—As with the simple scaling mediums, the rate of scaling increases with increase in temperature. Increasing the temperature from 1500 to 1700° F. doubles the amount of scale formed on a low carbon steel in an atmosphere obtained by complete combustion. Increasing the temperature from 1500 to 1900° F., however, results in a quadrupling of the amount of scale formed.

Time—The effect of time on scaling in combustion atmospheres is similar to that in simple scaling atmosphere. As the length of time in the furnace increases the effect of additional time becomes of less consequence.

Character of Furnace Atmosphere—Depending upon whether or not the furnace atmosphere is obtained by using theoretical proportions of air and fuel or excess of air or excess of fuel, the atmosphere will contain carbon dioxide and water vapor and nitrogen, or free oxygen, carbon dioxide, water vapor and nitrogen, or carbon monoxide, hydrogen, carbon dioxide, water vapor, nitrogen, and possibly unburned hydrocarbons.

2300° F.—Fairly high percentages of carbon monoxide are required in the combustion gases at 2300° F. if scaling of either carbon or alloy steels is to be appreciably reduced. With carbon steels the reducing effects become appreciable above 4 per cent carbon monoxide but a 50 per cent reduction of the scaling occurring in an atmosphere with complete combustion is not obtained until a carbon monoxide content between 12 and 14 per cent is present. With alloy steels, the reduction in scaling progresses fairly uniformly with increasing carbon monoxide and approaches a 50 per cent reduction between 10 and 12 per cent carbon monoxide. With 16 per cent carbon monoxide the scaling is largely eliminated.

1700° F.—Comparatively low percentages of carbon monoxide bring about effective reductions in scaling at this temperature. The presence of 1½ to 2 per cent of carbon monoxide brings about reductions of from 50 to 65 per cent of the scaling of carbon steels obtained in atmospheres of complete combustion or containing a slight excess of oxygen.

With alloy steels, from 1 to 2½ per cent carbon monoxide, depending upon the steel, bring about a similar reduction in scaling.

Further increase in the percentages of carbon monoxide brings about gradual but slight decreases in scaling.

Sulfur Bearing Furnace Atmospheres—Sulfur in furnace atmospheres is objectionable in that it increases the scaling activity and may be absorbed in the surface layers of the steel.

The scaling losses and penetrations of sulfides in atmospheres containing sulfur dioxide increase with increasing percentages of sulfur dioxide, with increasing temperatures and increasing time.

Summary

Complete or partial elimination of scaling or decarburization of steel are possible by means of atmosphere control. As certain components of the furnace atmospheres are agents affecting both decarburization and scaling, any application of the principles underlying the control of either one of these phenomena must take into consideration the possible effect on the other.

Mr. Mitchell Retires As Head of Bond and Share Co.

SIDNEY Z. MITCHELL, who began in the utility industry in the days of Thomas A. Edison, has resigned as chairman of the board of Electric Bond and Share Co. due to ill health. Mr. Mitchell will also resign all other business connections, it was announced. He was succeeded as chief executive of Electric Bond and Share, which he helped to found in 1905, by C. E. Groesbeck, formerly president, who in turn was succeeded by S. R. Inch, formerly executive vice-president.

Mr. Mitchell celebrated his seventy-first birthday about two months ago.

Mr. Mitchell is a member of approximately thirty-five boards of directors. Among those he will relinquish are the following: American Gas and Electric Co., American Power and Light Co., Commonwealth and Southern Corp., International General Electric Co., Irving Trust Co., National Power and Light Co., Postal Telegraph and Cable Corp. and United Gas Corp. Of some of these boards he was chairman, in addition to being on the executive committees.

Mr. Mitchell has long been a figure in the utility industry. He was born in Dadeville, Ala., in 1862. His parents died before he was 12 years old. He worked his way through a neighborhood country school and a preparatory school at Columbus, Ga. In 1879 he entered the United States Naval Academy at Annapolis, specializing in electricity.

Mr. Mitchell acquired the license to operate an Edison electric system in the Northwest in 1885. He went to Seattle, remaining there for approximately twenty years, building, operating and financing electric plants in the Northwestern states and British Columbia. In the same year he obtained his Edison license he built the first central station incandescent electric lighting plant west of the Rocky Mountains. In 1886, a year later, he built his first hydro-electric plant.

At the request of the late C. A. Coffin, of the General Electric Co., Mr. Mitchell returned to New York in 1905 to participate in the organization of the Electric Bond and Share Co.

Volume Water Heating—A Complementary Load

By E. J. Devlin*

Research Engineer
The Brooklyn Union Gas Co.

YEARS ago, the gas industry was dependent altogether on gas illumination and then, within a very few years, this business was replaced with the cooking load and other utilization of gas. We now have in some parts of the country the threat of electric competition in both the cooking and water heating fields. The seriousness of this competition is dependent upon the given local conditions but, in general, the economy and better performance of gas is still recognized.

The trying times which business has gone through during the last few years have demonstrated to utilities, both gas and electric, that those companies with a higher percentage of domestic load as compared with commercial and industrial, suffered the least loss in sales during the depression period.

Two types of domestic load which may be described as complementary and which may be further developed in the future, are house heating and load resulting from a promotional summer gas rate. This latter load will be composed largely of volume water heating, which should have the consideration of the utility, not only because of its permanent character but also because it will build up the valley of the load curve.

Discussion

It is generally agreed that the summer water heating load should be added before acquiring additional house heating, thereby filling the valley before establishing new winter peaks; but with the continued popularity of gas for house heating, it is expected that these peaks will tend to increase. A study of yearly sendout curves over a period of twenty years indicates a tendency toward a more pronounced valley during the summer months. This does not necessarily result from central house heating installations, but more particularly from the greater use of gas in the winter time. We, therefore, advance the thought that in view of the above and the fact that many companies are now offering house heating rates, consideration must also be given to promotional summer rates in order that the yearly load factor may remain undisturbed.

In taking on the large volume summer load with particular reference to water heating in apartment houses from April to October, a period of seven months, there are two things to be considered: First, the rate by which the load may be obtained; and second, the method of application, namely, the use of gas designed or conversion equipment.

A. *Rates*

Summer Water Heating—The rate offered will be the determining factor as to the quantity of business to be procured.

During 1932, the Large Volume Water Heating Committee of the Industrial Gas Section, through tests conducted in Brooklyn and elsewhere, determined the relative costs of water heating with coal, oil and gas as fuels. Comparing coal and oil, the latter is probably the more difficult to supplant with gas because the highly competitive nature of the oil industry results in very low fuel oil prices.

In the determination of a rate to obtain this business, we must first find out what the apartment house owner is willing to pay for the service. Tests previously conducted in an apartment house in Brooklyn, in which oil was used as a fuel, followed by gas of 540 B.t.u. value, indicate that thirty cent gas is the equivalent of five cent oil, and thirty-eight cent gas is the equivalent of six cent oil. In this comparison of gas and oil values, there is no allowance for certain intangible benefits to be derived from the use of gas over oil; as for example, the constant availability of the fuel, the elimination of smoke and fumes from the chimneys of apartment houses during the summer months and the reduction of the fire hazard.

Let us assume that the average apartment house owner will pay thirty-eight cents per thousand for this manufactured gas, of 540 B.t.u. heating value, and that on this rate, a considerable volume of business is available. Can a rate be offered below this figure of thirty-eight cents which will cover the cost of the gas and its delivery, and at the same time, result in a profit to the industry? Gas cannot be sold just for the sake of selling it, it must return a profit. Over a period of time, the effect of this business must be to bring about through improvement in load factor and increased sales, the possibilities of cheaper gas to all other consumers. The answer to this rests with each utility and must be individually determined. In view of the fact that this business is entirely off-peak, it could be taken on at a profit provided the price was such as to yield some margin over and above the cost of converting raw material into gas.

B. *Method of Application*

Gas Designed vs. Conversion Equipment—It is generally conceded that the gas-designed appliance is more efficient than a converted one. This is due, in some measure, to the fact that conversion equipment must operate in different makes of boilers sometimes having indefinite boiler ratings. The actual heating surface of boilers is often unobtainable and thus proper conversion is difficult. When, from an engineering standpoint, conversion is not practicable, the gas-designed boiler always furnishes satisfactory results.

From a standpoint of initial cost, conversion often dispels sales resistance. A good engineering knowledge

*Member Large Volume Water Heating Committee, Industrial Gas Section.

and sound judgment are required for proper conversion because the installation must readily lend itself to be dismantled when the end of the off-peak period has been reached. In our investigations, we find that where coal is being used in an apartment house, a small supplementary boiler is generally used for summer water heating. In this case, where the supplementary boiler has approximately the desired heating surface, a permanent conversion installation is possible. In our locality we find that if an apartment house is using the same boiler for summer water heating that it uses for space and water heating in the winter, a gas-designed boiler must be installed for summer water heating.

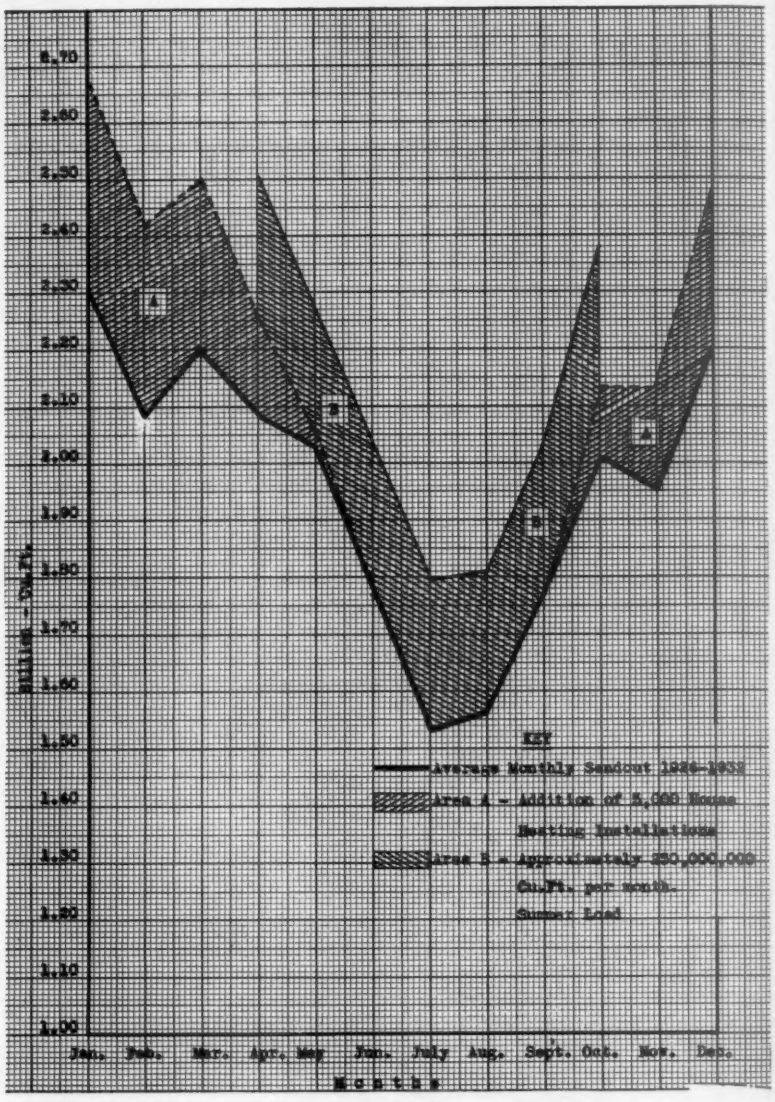
Load Factor

Large Volume Water Heating will improve the yearly load factor directly as the business is acquired. It is estimated that in Brooklyn, there is a potential summer water heating load of from two to three billion cubic feet.

Graph A shows the average yearly sendout by months, as obtained by averaging this company's monthly sendout figures during the last six years. To this graph has been added an estimated load of 5,000 house heating installations, consuming 380,000 cu.ft. of gas each per year. The monthly allocation of the gas added by the proposed house heating load is on a degree day basis. The added load obtained is shown by the cross hatched area, "A."

This graph also shows the effect of supplying, with the use of gas-fired equipment, the estimated demands for hot water in all apartments on our lines of twenty-five families and over. This is designated as Area "B" on the graph. We have added this load from April to October. A previous study concerning this summer water heating demand was made by this company in the summer of 1931, and it was then shown that there are approximately 68,600 families that would come under this classification. If this load were fully obtained, 250,000,000 cu.ft. of gas monthly would be consumed, this estimate being used in determining the area "B."

We believe that the addition of 5,000 house heating jobs within a



Graph A

period of ten years, under a promotional house heating rate, is a distinct possibility. We also feel that the estimated additional use of gas by summer water heating is at a minimum, since it should be possible under the same proposed rate for volume water heating to obtain many large installations, using industrial process steam.

It may also be mentioned that it is reasonable to expect that in the future a promotional house heating rate will obtain a further complement, namely, summer air-conditioning. This air-conditioning load will be added to the very bottom of the valley, and would have a marked effect upon improvement in load factor.

The following tabulation shows the effect on the load factor of adding the proposed house heating load only, and also that of adding the proposed house heating and volume water heating loads.

The tabulation on the next page shows that it is possible to increase gas sales over a period of ten years by approximately twenty-one per cent through the use of house heating and off-peak summer load and at the same time, maintain a constant load factor.

	Present	*Present House Heating*	*Present House Heating Water Heating*
Total Yearly Consumption	23,453,123	25,353,123	27,103,123
Average	1,954,427	2,112,760	2,258,594
Maximum	2,304,202	2,686,102	2,686,102
Load Factor	84.82	78.65	84.0

Canadian Gas Industry Expands in Face of Competition

THE use of natural and manufactured gas in Canada for both domestic and industrial purposes has had an exceptionally rapid expansion in the past decade, and the industry has shown itself capable to expand in the face of increasing competition from hydro-electric energy, according to a statement made in *The Financial Post*, Toronto, Canada, of March 11. The article continues:

"The last two years have seen some decline in consumption and in revenue due to adverse conditions both climatic and economic. Chief decline is due to decrease in industrial demand. It is notable, however, that in both Toronto and Montreal the number of customers has increased during the past two years although total volume of sales has been somewhat lower. The gas industry in Canada also includes the production of coke.

"In this industry, Consumers' Gas Co. of Toronto, Montreal Gas Co. and Montreal Coke and Mfg. Co., controlled by Montreal Light, Heat & Power and Hamilton By-Products Coke Ovens Ltd., controlled by Union Gas Co. of Canada and subsidiaries of British Columbia Power Corp. are the chief producers of artificial gas. Production of natural gas comes chiefly from Alberta and Ontario with Dominion Gas & Electric Co. the chief operator in the West and Union Gas Co. of Canada operating in the Ontario field.

"At the end of 1931, there were 33 plants engaged in the manufacture of artificial gas employing a capital of $51,235,000. There were eight coke plants in operation with capital employed in gas and coking plants in 1931 totalling $95,872,858 an increase over previous years and of this total $54,857,000 was employed in Ontario. The production and sales of artificial gas in Canada from 1927 to 1931 are as follows:

**Production and Sales of Artificial Gas*

	Production	*Sales Quantity*	
	M cu.ft.	*M cu.ft.*	*Income $*
1931	30,542,961	17,111,432	13,010,733
1930	35,927,532	17,713,477	13,471,629
1929	38,925,086	17,649,371	13,316,684
1928	35,058,920	15,606,609	13,933,537
1927	32,856,169	14,658,495	15,653,591

"Production of coke has become increasingly important although demand has been less in recent years. Ontario is the chief producer and consumer in the Dominion and production in Ontario, Quebec and the Maritime Provinces have not yet equalled the demand with the result that each year part of the needs of these consumers is met by imports from the United States. Production in the western provinces is somewhat ahead of demand and the West is an exporter of coke.

"Natural gas is largely used in the Prairie Provinces with Alberta holding the greatest resources of natural gas in the Dominion. The gas fields of Southwestern Ontario have been in production for many years and continue to supply the requirements of the district. In 1931, the production of natural gas in Canada was 25,874,723 M cu.ft. and had a value of $9,026,754. Of the total, Alberta supplied 17,798,698 M cu.ft. which had a value of $4,067,893. Ontario's production was considerably lower at 7,419,534 M cu.ft. but value was higher at $4,635,497. New Brunswick also has production of natural gas and in 1931 produced 655,891 M cu.ft. with a value of $323,184. The Canadian production of natural gas in 1931 and 1930 is as follows:

Production of Natural Gas

	M cu.ft.	*Value*
1931	25,874,723	9,026,754
1930	29,104,570	9,635,704

* As reported by Dominion Bureau of Statistics.

Joint Sales Conference To Open June 22

In keeping with the idea suggested at the 1932 Metropolitan Regional Gas Sales Conference, this year the Metropolitan New York and the New England Regional Sales conferences will hold a joint meeting which is scheduled for June 22-24 at the Griswold Hotel, New London, Conn.

H. R. Sterrett, New Haven Gas Light Company and president of the New England Gas Association, is chairman of the combined conference. The committee in charge is jointly composed of gas men of the New York and New England districts.

The joint conference will open at 8:15 p.m., Eastern Daylight Saving Time, Thursday, June 22. A strong program of live sales topics has been arranged.

Stockholders of Midland To Be Kept Posted

By J. N. Shannahan
President, Midland United Company

I ACCEPTED the presidency of this company a little more than two months ago with a deep sense of responsibility to the stockholders, customers and employees of the company. Never before having been connected with the company or any affiliated interests, it will take much time and study to become entirely familiar with all of its affairs and problems. While I do not want to undertake a detailed discussion of these matters until further study is made, I do wish to take advantage of this opportunity to outline briefly the general fundamental policies which will be followed by the new management in conducting the affairs of the company.

Mr. Shannahan

The new management of this company will at all times be fair and frank in all of its dealings with stockholders, customers and employees. It is our ambition so to administer the affairs of this company that we will merit the respect and confidence of all parties concerned and so secure their whole-hearted cooperation. Any practices which are not in harmony with these policies will not be tolerated. The business of this company will be conducted in such a way that it shall at all times have the confidence of investors and the general public.

Gas Mixing*

By R. M. Conner

Director, A. G. A. Testing Laboratory

R. M. Conner

DESPITE the fact that the practice of gas mixing offers one of the greatest possibilities for effecting economies in production existing in our business today, relatively little thought was given this subject until quite recently. It is not contended that this process represents an entirely new art nor that it has not been followed with varying degrees of success for a good many years. It is maintained, however, that very little scientific information has been available on this extremely complex subject until the last year, and that its importance has not been fully appreciated by the men of our industry.

In 1926, the American Gas Association's Committee on Engineering and Economic Survey of the Gas Industry, headed by H. E. Bates, of The Peoples Gas Light & Coke Company, realizing the importance of this subject, recommended to the Technical Section the creation of a special group of engineers to study this important problem. As a result, a committee of outstanding operators was selected, and F. C. Weber, of The Brooklyn Union Gas Company designated as chairman. After a very careful survey by this group, it was decided that our Association's Laboratory, in Cleveland, offered the most logical place for the conduct of such an investigation. Shortly thereafter, necessary arrangements were concluded and actual experimental work started in the spring of 1927. From that time on this study was pursued almost continuously until late in the Fall of 1932. Its completion required the conduct of some 175,000 separate tests, the results of which are recorded in more than 2,000 typewritten pages of detailed data and discussion. You will note that this investigation required some 5½ years for its completion. All of the detailed data secured from it are on file at our Laboratory and may be studied there by member company engineers after making application to and securing approval from our Association Headquarters. Final conclusions have been abstracted in three summary bulletins known as Laboratory Reports Nos. 597,645 and 689. All of these are available to member company delegates upon application to our Managing Director located at American Gas Association Headquarters in New York City.

Must Solve Complex Problems

It is not intended that this paper shall present a detailed treatment of the Laboratory's mixed gas research findings. All of this material is available in the previously mentioned reports and moreover it could not be covered here at sufficient length to make such a review really interesting or worth while. Rather, it is proposed to discuss the practical aspects of this subject and attempt to point out their importance in solving some of our industry's production problems. Few engineers, even, realize the complexity of the physical and chemical phenomena underlying the solution of all of our mixed gas research problems, nor do they appreciate fully the necessity of their solution if it is desired to provide satisfactory mixed gas service conditions to their customers at all times.

From the beginning it was realized that the correct control of certain fundamental factors would govern satisfactory gas mixing. These considerations are both physical and chemical in nature and are common terms used in reference to our product. Some of the more important follow:

1. specific gravity
2. heating value
3. chemical composition
4. gas pressure

Most of these items are interrelated and it is rather difficult to consider one without taking into account one or more of the others. In so far as possible, during our research work, however, the plan of isolating each controlling factor by keeping others constant was followed. For example, the effect of varying specific gravity was thoroughly studied by keeping other variables constant, or as nearly so as was possible under prevailing test conditions. In this manner we could determine the effect of varying different items, and, accordingly, analyze their effect upon gas appliance performance. All determinations of this nature were checked and rechecked innumerable times, lending accuracy and dependability to our findings.

Needless to say, many of the "rule-of-thumb" methods applied years ago in gas mixing practice were disproved, as were some of the more or less generally accepted theories of recent date relating to this subject. On the other hand, some of the former ideas which had been advanced were found to be substantially correct, sufficiently so, at least, to permit fairly successful application.

Our Laboratory was extremely fortunate in having such a competent advisory committee to outline its research and keep it at all times on the right track. All of the engineers of this group had been for years in contact with field problems of this nature and naturally understood the type of information that was desired. Moreover, this group contained natural and manufactured gas operators representing virtually all the large and varied gas interests of the United States.

Every Phase Covered

From the beginning it was agreed that only those aspects of this subject which were of national significance should be studied at any time. This policy was strictly adhered to from beginning to end. Furthermore, it was ruled that the appliances used during our investigation should be representative of all the different kinds commonly utilized in supplying domestic gas service. In addition, it was also ruled that a sufficient number of industrial appliances should be em-

* Address before Annual Convention of the Mid-West Gas Association, Des Moines, Iowa, April 11.

ployed to afford a fair index of the effects of varying gas service conditions on this class of equipment. As an added precaution, it was further stipulated that in so far as possible Laboratory approved appliances should be utilized throughout the investigation. This statement, I believe, will be taken to automatically imply that the allowable limits prescribed in our reports are probably somewhat more liberal than could generally be realized in the field. Accordingly, they should be interpreted as maximum, rather than minimum, limitations.

Numerous and collateral considerations, such as the use of certain types of low heating value manufactured gases as diluents for natural gas and for high heating value manufactured gases, and the feasibility of enriching manufactured gases with butane to provide a satisfactory substitute for natural and mixed gases, were investigated. Likewise, the utilization characteristics of different butane-air gas mixtures varying in heating value from 500 to 1,050 B.t.u. per cubic foot were thoroughly studied. In fact, it seems that almost every known phase of this subject was covered.

Permissible variations in specific gravity, heating value, and pressure, or the possibilities of compensating for variations of either of the first mentioned items by varying the last, were definitely established. All of these findings are set forth in a plain and easily understandable manner in our three summary reports. The effect of variations in chemical composition on appliance performance, as might be expected, was a rather complex matter. It would be entirely impractical to attempt to treat this subject here. It seems sufficient, however, to say that this item, in the last analysis, is the determining factor. To deal largely with this factor, the Laboratory developed an empirical formula, which makes it possible for any engineer to apply an equation to his situation and, by a number of mathematical computations, arrive at the solution of his problem.

Besides establishing definite limits for the variation of controlling factors, our research developed information that should permit operators to increase the flexibility of their supply. For example, it was found that, as long as the percentage of fast burning gases equals or exceeds the total percentage of slower burning constituents, the maximum variations of controlling factors may prevail. This statement is really more simple than it seems, as free hydrogen is about the only really fast-burning constituent of city gas. Consequently, it is largely a matter of balancing the percentage of this gas present with the total hydrocarbon gas content. Another very interesting discovery, along similar lines, pertained to the much debated theory relating to inerts. It was found, for example, that, if the presence of such gases (usually nitrogen and carbon dioxide) were accompanied by an equal or greater amount of hydrogen, the total percentage of them might be exceedingly high without producing undesirable effects. Proper recognition of this fact and the application of such knowledge to manufactured and mixed gas supplies should afford the possibilities for effecting marked economies in production in a good many cases.

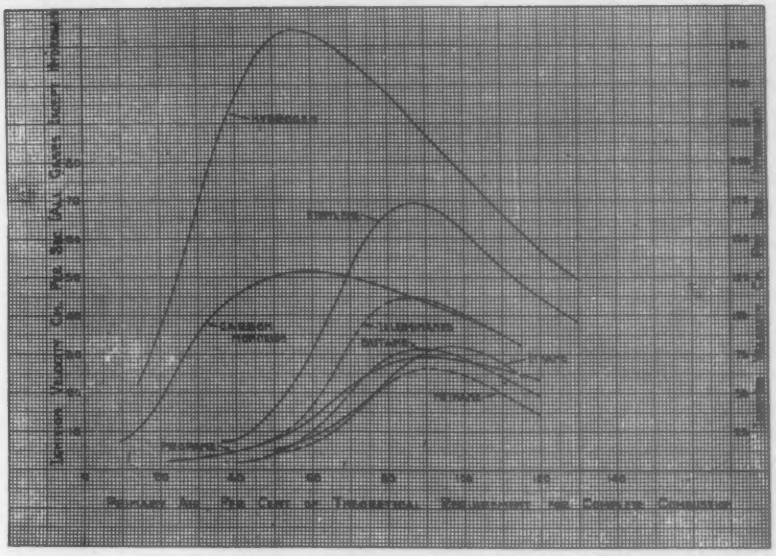


Figure 1
Ignition velocity for various simple gases

Light on Additional Subjects

As an adjunct to our main study, a great deal of useful information was recorded on the rates of flame propagation of simple gases. For the benefit of those who are technically inclined, or those who may care to study this paper further, a chart—Figure 1—has been provided containing a series of curves showing the ignition velocities of various gases. Considerable experimental work was necessary to develop an accurate method for determining this information. A procedure was finally adopted which, although different in many respects from other known methods, was found to provide extremely accurate results.

In addition to providing data on which to base the solution of our general problem, our study threw a great deal of light on a number of additional subjects which have occupied the minds of many gas engineers from time-to-time. One such item that comes to mind is the relative usefulness of various heating value gases. Our findings on this point were in line with the industry's latest accepted theories on the subject. As would be expected, there seems to be no direct cost relationship existing, however, between the gas supply conditions prevailing in one section of the country when compared with another. It should be perfectly obvious, I believe, that, in the last analysis, the price at which gas is sold must of necessity be a direct result of its cost.

While a general study of the economic aspects of the gas business was not the object of our investigation, so many different mixtures and kinds of gases were investigated that this con-

sideration naturally came in for a great deal of thought. Briefly speaking, we were unable to find anything at variance with the accepted theory that the best type of gas to supply in any given community is the one that can be delivered to the customer at the least cost per B.t.u. This theory assumes, of course, that the gas supplied is of such a constituency that it will afford satisfactory domestic and industrial gas service. Presumably, this theory applies with equal accuracy to manufactured, mixed, or natural gas. Although this point seems quite obvious, it is mentioned here because it is a rather controversial one, and on account of the fact that there are some engineers, particularly outside of our industry, who still hold contrary ideas.

Mixing Certain to Grow

At this stage of the discussion it seems that we might profitably analyze the research work which I have been discussing from the standpoint of its future value to the gas industry. Presumably, we can assume that the practice of mixing gases will become more general as time goes on and that this development will undoubtedly be brought about largely by one or more of the following factors:

1. Inadequacy of the base load supply to meet peak load demands.
2. Production of surplus quantities of readily available by-product gases such as coke oven gas, refinery oil gases, etc.
3. Introduction of a cheaper supply of gas into a given territory where such gas possesses characteristics which are satisfactory for mixing purposes but the amount of which is inadequate to meet peak load demands.

It should be apparent that, where it is possible to conveniently mix a cheaper gas with a more expensive base load supply, economies in production should result. On the other hand, the mathematics of a problem of this nature are generally not as simple as they appear at first glance. As we all know, the demand varies from day to day and from year to year. This fact necessitates the installation of expensive gas mixing control devices which will compensate for variations in the demand, all of which naturally involves additions to our capital account. Moreover, it may become necessary, during certain seasons of the year, to supply even a third gas at a much higher unit cost, which means that even the most simple gas mixing situations present some engineering and economic problems.

Prior to the publication of our reports, it had been thought necessary by utilities considering the introduction of mixed gas into their territories, to first set up a group of representative appliances, equip a laboratory, and often expensively transport sufficient quantities of the test gas from distant fields. Furthermore, such studies have in the past, at least in their initial stages, been more or less "cut-and-try" methods, all of which has added greatly to their ultimate cost. Still further, it has generally been considered necessary to supplement all such laboratory determinations by actual experiments in the field, which has invariably placed a rather heavy financial burden upon the interested company at a time when it could often least afford it. It is very gratifying to report that our Laboratory's findings have been checked in the field in several different sections of the United States and have been found to portray accurately the results which one would logically expect.

The fact that more than 250 different gas mixtures were studied and that complete information is available on them now in our files makes it possible for any interested member company engineer to secure information on most any gas mixture that he may desire. This fact likewise makes the conduct of expensive laboratory and field tests by gas companies unnecessary, or at least should greatly reduce their scope. More than this, there is a definite advantage in having available findings prepared by an impartial agency which has attacked the problems from a national viewpoint with the thought of all interested agencies in mind.

Appliance Manufacturers Interested

There is another angle to this subject that it seems should be considered here. The American Gas Association's whole gas appliance testing and approval program has been established on the theory that the improvement of our gas service conditions is a mutual undertaking in which both manufacturers and gas companies must cooperate. Where a gas mixing problem is worked out with only one point of view in mind or without proper consideration of all the interests involved, it is obvious that the final answer can by no means be as satisfactory to the industry at large as if arrived at under the previously mentioned plan.

Interest shown in our mixed gas research findings by appliance manufacturers has been surprisingly great. For many years these concerns have been desirous of producing equipment that will provide as wide a degree of flexibility as is possible. There has been relatively little information available, however, that would assist them in such matters. Although our mixed gas findings were not prepared primarily for the purpose of assisting in the solution of such problems, on the other hand, appliance manufacturers can, if they are sufficiently interested, secure a great deal of helpful information of this nature from them. This statement is particularly applicable to manufacturers of industrial equipment.

Another class of our members who should benefit especially from our research efforts are the works equipment manufacturers. A number of new gas making processes are now in the course of development. The greater portion of such effort is being confined, for the present at least, to the perfection of a process for producing a relatively high heating value oil gas of such physical and chemical characteristics that it may be satisfactorily and completely interchanged with a base supply of natural gas. There are a number of modifications of such a plan also receiving considerable thought and it is to the engineers interested in these new developments that our findings should prove especially helpful.

It seems sufficient to merely mention the class of our manufacturer members who produce gas mixing equipment, calorimeters, orifices, meters and other works control equipment. Their interest in our research and the value of our findings to them should be perfectly obvious.

Taken by and large the member companies of your Association are located in a section of our country rich in natural resources. Your gas engineers, on the whole, are as competent as we have anywhere in the United

(Continued on page 219)

Leaders of Industry To View Gas Exhibits When Fair Opens June 1

By Charles W. Person

AT 10 o'clock on the morning of June 1, rain or shine, inflation or deflation, and come what may, the gates to A Century of Progress International Exposition will be officially opened to the world. Thus will Chicago make good its promise of more than five years ago not only to stage the most ambitious fair project ever conceived but to open it on time.

Millions of dollars already have been invested in buildings and in reclaiming 424 acres of land for the exposition site from the clutches of Lake Michigan. Millions more have gone into the exhibits and concessions, and additional great sums are now flowing into Chicago to speed up final preparations during the hectic thirty days that remain prior to the opening.

Old Heidelberg's all-gas kitchen with a capacity of 10,000 meals a day

In an almost literal as well as a figurative sense, this first great fair of the automobile age has "hitched its wagon to a star." When the Columbian Exposition opened forty years ago, in 1893, the orange star Arcturus was overhead in the evening sky. Light that left it then will arrive in Chicago this year. By applications of modern science the energy in this light will be amplified and used to start the wheels of the exposition. In 1893 President Cleveland opened the exposition by pressing the button of an electric switch. This year's world's fair will be started on its way by Arcturus, so far distant that its light, traveling at the rate of 186,300 miles per second, has required forty years to pierce the ether and reach us.

Preparations of the American Gas Association and its manufacturer company members for displays at the fair are in their final stages and everything is operating strictly up to schedule. The first group visit of gas men to the fair will be June 1 and 2, the dates of the Executive Conference to be held at the Hotel Stevens.

Gas service right in the middle of things. Five miles of gas mains serve the Fair

Word has been received from Lenox R. Lohr, general manager of the exposition, officially designating Tuesday, September 26, as International Gas Industry Day in recognition of the International Gas Conference and Fifteenth Annual Convention of the American Gas Association to be held in Chicago the week of September 25. An international aspect is given the convention this year because of the visiting delegations of British, French and German executives and engineers of gas companies who will tour Canada and the United States and be in attendance at the Chicago convention.

Finishing touches are being placed on Gas Industry Hall and Home Planning Hall, the two main exhibit pavilions housing a majority of the gas industry's displays. From the standpoint of attracting attendance the location of these pavilions between the 23rd Street and 31st Street entrances to the fair grounds leaves nothing to be desired. Forty-two per cent of the paid admissions of one million pre-fair visitors have been collected at these two entrances, proving that the main gas exhibits are very favorably located.

Plans submitted for utilizing the fore-court entrance to Gas Industry Hall in some striking manner representative of the industry's contributions to human welfare

Radiator in Ann Rutledge Tavern. The Fair is 98 per cent gas heated

have resulted in the selection of a unique Fountain of Flame symbolizing the service rendered by gas through the medium of heat.

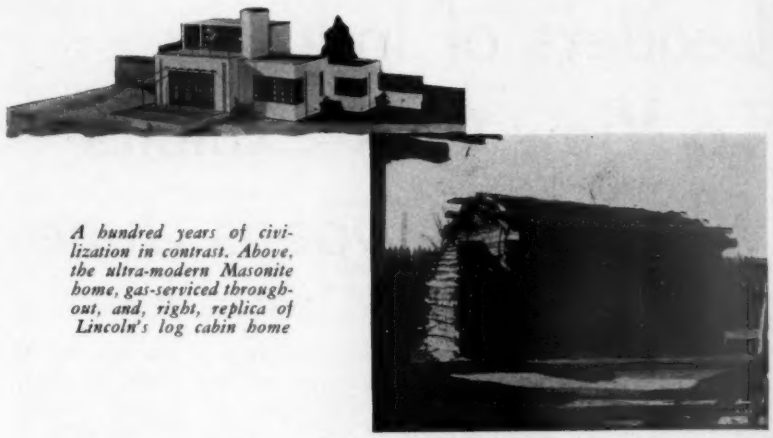
The Fountain of Flame will appear as a tall pilaster-like concave structure about fourteen feet in height which will glow as though it were red hot iron, suggestive of the large part that heat developed from gas is playing in the industrial and metallurgical industries. Issuing from the top of the structure will be two jets of luminous gas flames merging into one large flare, symbolizing the joint service being rendered by natural and manufactured gases in modern civilization. Jets of steam effectively placed around the Fountain will contribute to its suggestion of heat.

A globe, representing a glowing earth in that stage of its existence when heat energy was predominately in evidence, will be in the foreground, while immediately below steaming springs of colored and luminescent waters will bubble forth and cascade into lower pools of exceptional beauty.

The "daringly different" in the field of architecture is a striking characteristic of this most modern and unorthodox of all world fairs, and it applies as much to the residential housing exhibit as it does to the huge pavilions and exhibition structures. There are nine model homes in all, situated on both sides of Leif Eriksen Drive, in the immediate neighborhood of Gas Industry and Home Planning Halls.

Nothing remotely approaching this housing show has been attempted heretofore. Each of the nine homes is built of a different material, several types of which were pre-fabricated and assembled on the spot. Every modern device contributing to home comfort will be installed in these homes and the interiors will be executed by nationally known designers. Six of the nine homes will show the latest styles in gas ranges, and five will feature the most recently developed types of gas air-conditioning apparatus. Negotiations are now under way for the inclusion of additional gas-using equipment.

From the standpoint of dramatic interest the "star" of the housing group is the Masonite model home—a completely gas-serviced structure. It is the home located nearest to the replica of Lincoln's log cabin at Hodgenville, Kentucky, and by comparison depicts better perhaps than any other exhibit on the vast exposition grounds the tremendous advances achieved in living standards during the last one hundred years.



A hundred years of civilization in contrast. Above, the ultra-modern Masonite home, gas-serviced throughout, and, right, replica of Lincoln's log cabin home

The Lincoln cabin is constructed of logs taken from a house found standing in Jersey County, Illinois, which dates back more than one hundred years to Lincoln's boyhood days. The clay used for clinking between the logs, for plastering the fireplace chimney, and even for the floor itself was brought from Kentucky.

The Masonite home, ultra-modern in every respect, utilizes a tough wood fiber insulating board, available in prefabricated units. The windows are of double-glass with a chemically treated space in between that eliminates frosting of moisture due to condensation. Both windows and building materials make for ideal conditions for demonstrating the possibilities of gas air conditioning. The house consists of four rooms and bath, in-built garage and a solarium opening onto the roof.

Every heating operation carried on in this home will depend upon gas service and the latest word in gas-using appliances. Gas will heat the water, make ice cubes, cook the meals, burn the rubbish, dry the laundry, and maintain a predetermined temperature throughout the rooms. The range will be all enamel, automatically lighted, with elbow-room cooking top, and insulated ovens equipped with heat control. The refrigerator will be of the latest air-cooled type. The air-conditioning unit will have its front panel replaced by glass so that the inner workings may be seen. Other gas-using appliances, now under consideration for installation, will represent the latest innovations in their respective classes.

The special exhibit buildings of the

Special exhibit pavilion of the Johns-Manville Corporation. A mural painting ninety feet long will be featured

"Livable basement" display of the Bryant Heater and Manufacturing Company. See text for detailed description

Johns-Manville Corporation and the American Radiator and Standard Sanitary Corporation will contain complete lines of their appliances, products and accessories. A feature of the "J-M" building will be a mural painting, ninety feet long, depicting the company's four "controls" in the fields of heat and cold, motion, fire and weather, and sound. These will be treated symbolically in the mural.

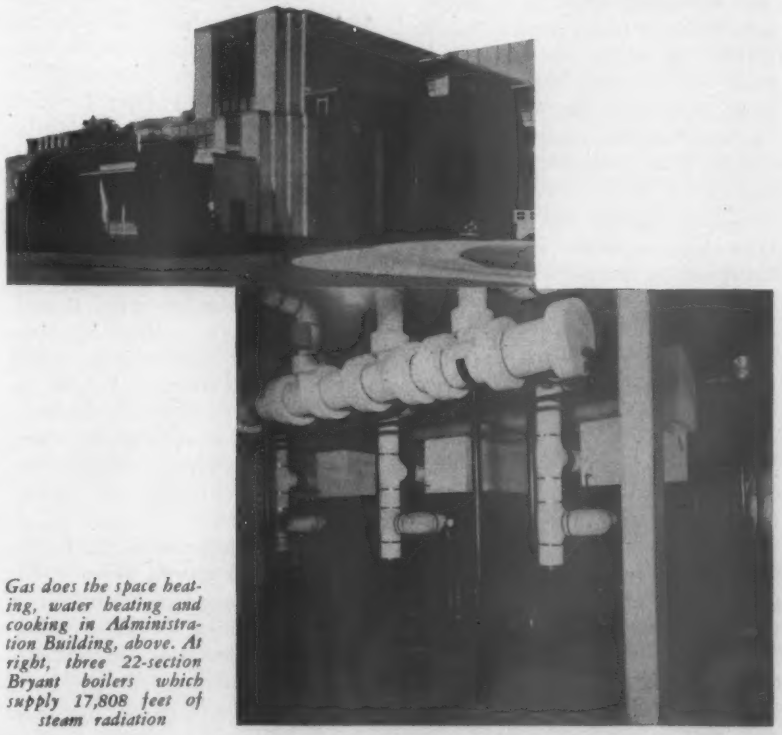
Two buildings, one known as the Heating Building and the other as the Sanitary Building, will constitute the exhibition quarters of the American Radiator Company and Standard Sanitary Corporation. In the Heating Building will be shown all heating and air-conditioning apparatus as manufactured by the American Radiator Company and subsidiaries. In the Sanitary Building will be shown the latest and most improved sanitary devices such as bathroom and kitchen equipment. The American Gas Products Corporation will be represented in the Heating Building with a full line of its products.

While concentration of the gas industry's exhibits will be in the Home and Industrial Arts Section of the exposition grounds, gas service will be found very much in evidence at other points. In providing for facilities to feed an estimated daily attendance of 200,000 persons, gas fuel has been specified for cooking, baking, water heating, space heating and incineration. Restaurants, large and small, sandwich shops, potato chip counters, hot dog stands, coffee and doughnut dispensers, rotisseries, cafeterias—all will use gas fuel in the preparation of food.

The two largest eating places are the Blue Ribbon and Old Heidelberg restaurants. Heavy duty gas ranges and a full line of gas-using kitchen equipment already are installed in these places. The same is true of Eitel's, the Sears-Roebuck restaurant, the Ann Rutledge Tavern, Adobe Barbecue Sandwich Hut and others. Gas fuel will do the water heating and space heating in these larger places as well as the sandwich and hot dog stands. A number of Bryant boilers, Ruud water heaters and Surface Combustion unit heaters are presently in use.

Hot water requirements in the Sears-Roebuck building will be provided by two Peerless boilers. The flashings, gutters and rain pipes of the Masonite model home will be of Anaconda copper. In addition to its display in the Strandsteel model home, the Fox Furnace Company will have a second air-conditioning unit in the American Radiator building. While no duct work for carrying the conditioned air will be installed, gas will be piped to the display so that the unit will be under fire. Water and electricity also will be connected to permit of an actual operating exhibit.

The Steam and Combustion Company will have its gas-fired boilers in the Firestone Tire exhibit, the dry-cleaning and pressing establishment of Carl Stockholm, and the American Radiator building. The Minneapolis-Honeywell Regulator Company will have its safety controls in use in the Firestone Tire and Quaker Oats exhibits, all model homes with air-con-



Gas does the space heating, water heating and cooking in Administration Building, above. At right, three 22-section Bryant boilers which supply 17,808 feet of steam radiation

ditioning units installed, and in Old Heidelberg restaurant where eight gas-fired unit heaters are now being used. A replica of the original Tappan range placed in the dirigible Macon is to be given space in the Goodyear exhibit. The bitumastic solution and enamel of the Wailes Dove-Hermiston Corporation have been used as protective coatings on the gas mains serving the fair. Dresser couplings are used on both gas and water mains within the grounds. Worthington Pump and Machinery Corporation has supplied pumping equipment for the exposition's general water supply and fire service, and the three towers of water and light located in the lagoon. The water plant at the fair has a 30,000,000-gallon capacity.

A large quantity of pipe, valves and fittings have been supplied by James B. Clow and Sons, who have also installed a number of their gas steam radiators. The Crane Company has its own exhibit building but its equipment will be found at many places on the grounds, including some of the model homes. A large exhibit will be sponsored by the Carbide and Carbon Corporation, including a special display of pyrofax.

Companies specializing in office equipment are planning some unusual attractions for gas company accountants who will attend the A. G. A. convention the week of September 25. Individual exhibits at the fair will be made by the Addressograph Multigraph Corporation, Burroughs Adding Machine Company, International Business Machines Corporation and Underwood-Elliott Fisher Company. Other exhibits of products and services having a direct application in the gas industry will be sponsored by Petroleum Heat and Power Company, Pittsburgh Equitable Meter Company and National Tube Company.

As previously announced, Home Planning Hall and its annex, Gas Industry Hall, will house the most impressive gas exhibits at the exposition. These will be sponsored by the Bryant Heater and Manufacturing Company, Holland Furnace Company, Surface Combustion Company, American Stove Company, Electrolux Refrigerator Sales Corporation and the American Gas Association. The last two named will have their exhibits located in Gas Industry Hall and the others will be found in the adjoining Home Planning Hall.

The main feature of the American Stove Company's exhibit will be a large booth housing miniature kitchens of different periods, running back to 1833 and ending with the modern 1933 kitchen in which will be shown a range with all its automatic features. Mural paintings will adorn the walls. Progress in the construction of gas burners also will be shown, and the original oven heat regulator and the refinements made in this device will be featured.

Holland Furnace Company will concentrate upon the advances made in the art of air conditioning, reproducing a model basement showing a complete system including heater, air-conditioning unit and refrigerating unit, equipped with ducts. Provision is being made for animating this display.

The central feature of the Electrolux exhibit will be an eight-foot model showing how a tiny gas flame produces refrigeration in the new air-cooled type. The model will be surrounded by piles of artificial ice and by small pavilions in which some of the earliest models of gas and electric refrigerating units will be displayed.

Diagonal backgrounds of blue and silver lacquer will divide the booth into four sections in which a complete line of air-cooled gas units and hermetically sealed electric units, including ice cream cabinets and commercial cooling equipment will be displayed. An interesting feature will be invisible lighting coming from 25-foot steel H beams which support the ceiling.

The exhibit of the Surface Combustion Company will consist in general of a decorative background symbolizing gas flames which, when lighted, give action effects. Further ingenious use of lighting effects will be drawn upon to show a living room with circulating air as provided by the company's equipment, and the same room without air circulation, a condition existing with older types of heating equipment.

A modern treatment of the livable basement is the general theme of the display sponsored by the Bryant Heater and Manufacturing Company, shown in the illustration herewith. Walls, floors and furnishings all have been given this modern handling, not only for the purpose of preserving the spirit of the fair but also to accentuate the modernness of gas heating and air conditioning.

While that part of the exhibit first seen by the visitor portrays the livable basement, behind the wall at the left will be located all the equipment usually found in a basement—heating plant—the front of which has been built into the wall—pipes, ducts, washing machine, laundry tubs, water heater, fuse and switch box, etc. This part of the "basement" is accessible around the end of the wall as seen in the center of the picture, and will serve not only as a contrast between an ordinary and modern basement, but also to suggest a method of concealing those unsightly necessities of the modern home.

The heating plant shown is the Bryant Dualator, combination steam heating and air-conditioning unit. While there will be no gas connections, the motor and blower will be operating. Air ducts will deliver the circulating air from the Dualator to the louvers in the front wall on either side of the exhibit. This stream of air naturally will serve to attract the attention of passers-by.

The four panels to the left and above the heating unit are one-way glass—that is, glass through which light will travel only in one direction. While the main flood light in the ceiling is on, and those behind the glass are out, the glass appears to be a mirror. When the light in front is out and those behind are on, the glass becomes transparent and the space behind the wall is revealed. In other words, the glass is transparent only from the side opposite the light, the other side appearing to be a mirror. For this reason, the main light in front and those in the back room will alternate on and off automatically to produce this effect.

The picture on the back wall will not be as shown in the photograph. Instead there will be four pictures, modeled in relief, colored and indirectly lighted, one showing two couples playing bridge, another a dancing scene, the third a snow sports picture and the fourth illustrating a couple departing from home, leaving the children in care of the maid. These four pictures will be titled "Enjoy 200 extra hours" and are intended to suggest

ways in which the extra time made available by gas heating can be used.

To the left of this group, on the back wall, but not shown in the photograph, will be two plaques. One of these will show, by an electrical diagram, the operation of the control system on the three 22-S-63 Bryant steam boilers heating the Administration Building at the exposition. The other will be a similar diagram of the operation of the air-conditioning equipment in the Masonite Home.

The American Gas Association's exhibit will occupy an area of approximately 300 lineal feet running around Gas Industry Hall, with Electrolux occupying the entire center space consisting of 4500 square feet. Without the aid of suitable illustrations which are not available at this writing, it is impossible to give a detailed description of the extent and scope of the Association's display. The following general description will give an idea of what is being attempted in the way of an animated and representative portrayal of both the natural and manufactured gas industries and their place in the scheme of things.

The exhibit at large consists of three main parts, occupying the South, West and East walls of the hall. Each of these parts is, in turn, divided into various sections. In the South portion, for instance, will be exhibited the production and distribution of natural and manufactured gas, each having its separate delineation. The central feature of this South portion—one dividing natural gas from manufactured gas—will be a great gas flame containing an animated genii, with a modern city appearing below in detail. Scale models, dioramas and other devices will be utilized to give realistic effects. On both sides of this South section will be projection screens, 4 x 4 feet, reproducing pictures of outstanding developments in the natural gas and manufactured gas industries.

The main features of the West wall section will be portions devoted to the A. G. A. Laboratory, and domestic utilization of gas. A modern bungalow built to half scale and constructed of sheet rock will depict the domestic uses of gas service in dramatic manner. Five dimensional cut-outs indicating kitchen, basement, laundry, living room and bathroom will be covered with theatrical gauze which will hide them from view until they are lighted, one-by-one, following a cycle correlating each to its source of gas supply—the bathroom to water heater, the living room to house heating boiler, and so on.

The East wall portion will be devoted in the main to historical and industrial gas exhibits. Among many of the devices to be utilized in showing the progress of gas-using equipment will be three cut-out dioramas independently lighted to illustrate the old and new kitchen, old and new basement and the old blacksmith forge versus the new gas-fired forge.

Fourteen dioramas, individually illuminated, and representing actual industrial gas installations taken from photographs, will be a dramatic feature of this section. There will be on display a huge glass thermometer with temperature ranges from 212° F. to 3000° F. The temperature will rise from the lowest point to the highest and as it strikes each increased point the diorama with the corresponding industrial installation will flash on for an interval, then off. At the end of this East wall section will be a reception room equipped with lounging and registration facilities.

Advantage will be taken of a large amount of wall space for the placing of murals. A reproduction of these will appear in THE MONTHLY.

Frank T. Hulswit Passes Away

FRANK T. HULSWIT, widely known public utilities financier, died suddenly in New York April 2. Although he had maintained his home at Grand Rapids, Mich., the city in which he was born on September 10, 1875, Mr. Hulswit had had his office for many years in New York.

Mr. Hulswit was a descendant of John Hulswit, eighteenth-century Dutch painter, whose canvases hang in the National Gallery at The Hague. He began his climb to a position of leadership in the utilities field as an office boy for the Michigan Trust Company of Grand Rapids. A year later he went to Chicago to sell bonds for McDonald, McCoy & Co. In 1904, with Ralph Childs, he opened his own bond house in Grand Rapids, Child-Hulswit & Co., which he headed until 1912.

He enlarged the bond house's business by buying public utilities through Michigan, Illinois, Iowa, Tennessee and Indiana. He founded the United Light and Railways Company, which also expanded and became the United Light and Power Company, the presidency of which he assumed in 1910.

With Cyrus S. Eaton of Cleveland, he effected in 1924 a merger of Western public utilities companies. On his own account he purchased the Brooklyn Borough Gas Company in 1925 and later organized the American States Securities Corporation. When the stock market slumped in 1926 he was interested in utilities serving communities throughout the country, at times from Maine to Florida and from New York to the Rocky Mountains.

He was at that time also, as an organizer and director of the American Super-Power Corporation, an associate of officials of some of the country's largest power systems. The maze of falling quotations, however, trapped the United Light and Power stock pool of which he was the leader. Virtually the entire floating supply of United shares was taken out of the market by a banking syndicate.

Mr. Hulswit resigned from the United presidency on March 10. Stockholders representing seventy-five per cent of the voting stock returned him to the board and by June 9 he was returned to the presidency. In January, 1927, he began organization of the American Commonwealths Power Corporation, starting an expansion program that in 1929 had carried its influence from New England to the South and late in the year had also spread to the New York area and to Canada.

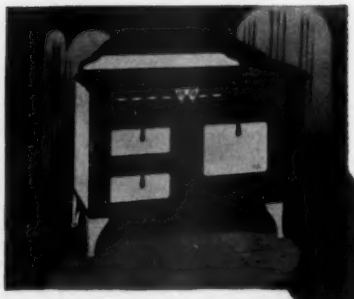
American Commonwealths obtained an interest in United Light and Power that resulted in Mr. Hulswit's return on April 18, 1931, to United's board, a post he relinquished on February 28 last year.

At the end of 1931 receivers were appointed for the corporation, and Mr. Hulswit resigned the presidency, retaining an interest in it.

Mr. Hulswit, who was the son of Frank Michael and Johanna Ursula Louis Hulswit, was educated at the Grand Rapids High School and was married on June 20, 1900, to the former Cornelia Maria Hoebeke of Grand Rapids. They had three children, Charles, Louis and Robert Marius.

He was a member of the Advisory Council of the American Gas Association and a member of the Metropolitan, Bankers, New York Athletic and Downtown Athletic Clubs of New York, the Peninsular and the Highlands Country Clubs of Grand Rapids, the Union League Club of Chicago, the Union Club of Cleveland and the Congressional Country Club of Washington.

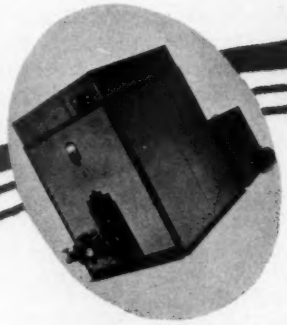
Some Appliances and Equipment To Be



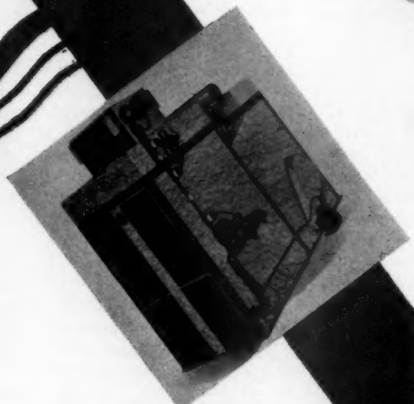
Left: Cribben and Sexton range.

Right: Addressograph Multigraph billing machine.

Right, below: Surface Combustion heater.



Below: A-B Stove Company range in Porcelain Enamel display.



Above: Fox Furnace air-conditioning unit in Strandsteel home.

Below: Gas burner of Petroleum Heat and Power Company.

Above: Faraday refrigerator in General Motors exhibit.

Right: Range of Favorite Stove and Range Company.

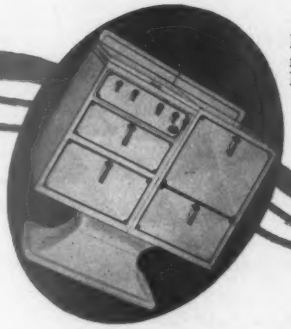
Left: Mural of Travel and Transport Building.

Right: Pittsburgh Equitable meter.

To Be Featured at Chicago World's Fair

Bel[illegible]nge of Cro[illegible]e Works.

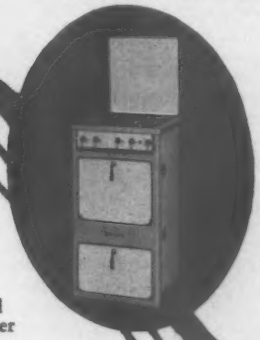
ove: Co[illegible] burner of face Co[illegible] Corporation.



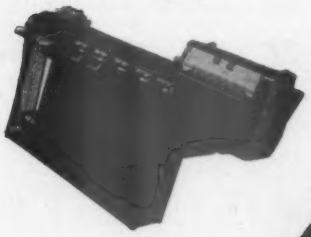
Left: Pedestal table range of Oakland Foundry Company.

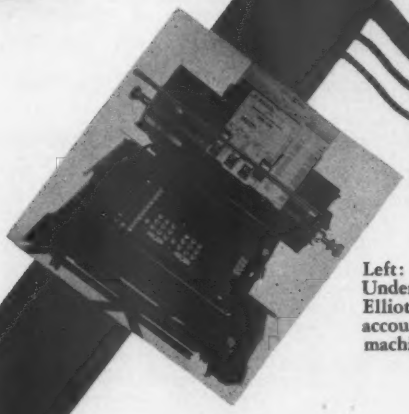
Right: American Stove Company range in Masonite home.

Below: Range of Standard Gas Equipment Corporation.



Below: Bill feed tabulator of Tabulating Machine Company.

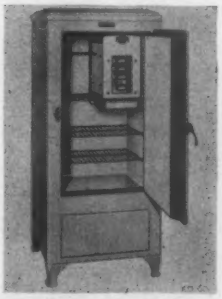


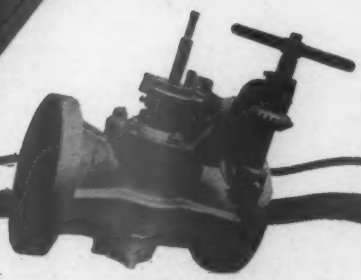


Left: Underwood Elliott Fisher accounting machine.

Left: Eagle Foundry Company range.

Below: Electrolux refrigerator in Masonite home.





Left: Gear operated, lubricated plug valve of Crane Company.

Right: Mural of Hall of Science Building. This and mural on opposite page executed by Sherry A. Sherwood.

Affiliated Association Activities

Mid-West Gas Association

Robert L. Klar

OPTIMISM was the key-note of the Mid-West Gas Association convention which opened at the Fort Des Moines Hotel in Des Moines, Iowa, April 10. Attendance was surprisingly large and one of the most interesting programs ever arranged in the association's history was presented during the various meetings, which were concluded April 12.

The convention opened with President Watson E. Derwent of the Geo. D. Roper Corporation, presiding, and the first speaker was Governor Clyde L. Herring, of Iowa, who spoke on the need of tax reduction. The response to this talk was made by C. A. Leland, Jr., vice-president and general manager of the Des Moines Gas Company.

A short business meeting followed at which officers for the 1933-34 Association year were elected as follows:

President, R. L. Klar, Des Moines, Iowa; first vice-president, C. T. Williams, Sioux City, Iowa; second vice-president, F. H. Brooks, Omaha, Neb.; secretary-treasurer, R. B. Searing, Sioux City, Iowa.

Executive Council. J. H. Fagan, Milwaukee, Wisc.; M. J. Roberts, Buffalo, New York; R. L. Schacht, Lincoln, Neb.; S. D. Whiteman, Sioux Falls, S. D.; Amos H. Abbott, Minneapolis, Minn.; A. L. Fritchey, Pittsburgh, Pa.; C. I. Merrick, Ames, Iowa; F. W. Budd, Rochester, Minn.

Affiliation Representatives. Commercial Section, Stanley Tabor, Iowa-Nebraska Light & Power Co., Lincoln, Nebraska; Accounting Section, A. W. Schmitt, Des Moines Gas Company, Des Moines, Iowa; Technical Section, P. A. Stover, Central States Electric Company, Cedar Rapids, Iowa; Manufacturers' Section, Thos. Bullion, Detroit-Michigan Stove Company, Detroit, Michigan; Advertising Section, C. A. Nash, United Light & Power Engineering & Construction Company, Davenport, Iowa; Industrial Section, L. O. Rasmussen, Union Light, Heat & Power Company, Fargo, North Dakota.

R. J. Canniff and A. W. Schmitt gave interesting accounts of the activities of the A.G.A. Manufacturers' and Accounting Sections, respectively.

Ira Steele, of the Des Moines Gas Company, presented a report on the development of gas company employees. He emphasized particularly the valuable assistance rendered by his company's employees during its change-over from manufactured to mixed gas. An interesting review of papers which had been presented at the Twelfth Meter School and Conference held in Ames, Iowa, was given by J. M. Drabelle, of the Iowa Electric Light & Power Company.

Outside of the report made by the A.G.A. Technical Section's representative, P. A. Stover, and the paper on gas mixing, presented by R. M. Conner, director of the American Gas Association's Testing Laboratory, Cleveland, Ohio, the entire program on April 11, was devoted to the consideration of commercial aspects of the gas business. Addresses were given by E. J. Boyer, of the Minneapolis Light Company, Edwin A. Jones, of the L. J. Mueller Furnace Company, and Thomas E. Bullion, of the Detroit-Michigan Stove Company.

A feature of the entertainment program was a stag banquet held at the Fort Des Moines Hotel. It was followed by dancing.

At the closing session, Frank Goode, of the Des Moines Gas Company, discussed load building through gas water heating, and Walter H. Hoagland, of The Sonner Burner Company, gave a talk on conversion burners.

President Derwent, in closing the convention, voiced the unanimous feeling of those in attendance that the Mid-West Gas Association had concluded one of the most interesting and valuable meetings ever held in its history.

Convention Calendar

May

2- 4 A.G.A. Southern Regional Sales Conference
Washington, D. C.

2- 4 Southern Gas Association
Washington, D. C.

2- 5 Chamber of Commerce of United States
Washington, D. C.

9-11 Pennsylvania Gas Association
Wernersville, Pa.

15-17 Natural Gas Association
Tulsa, Okla.

17-19 American Petroleum Institute, Mid-Year Meeting
Tulsa, Okla.

22-23 American Gas Association Joint Committee Conference of Production & Chemical Committees
Hotel New Yorker, New York, N. Y.

May 29 to June 1, National Fire Protection Association
Milwaukee, Wisc.

May 30 to June 2, Institution of Gas Engineers (British)
Liverpool, England

June

1- 2 American Gas Association, Executive Conference
Chicago, Ill.

12-15 National Association of Purchasing Agents
Chicago, Ill.

22-23 Pacific Coast Gas Association, Northwest Regional Conference
Olympic Hotel, Seattle, Wash.

22-24 New York-New England Regional Sales Conference
Griswold Hotel, New London, Conn.

26-28 Advertising Federation of America & Public Utilities Advertising Association
Grand Rapids, Mich.

26-30 American Society for Testing Materials
Chicago, Ill.

26-30 American Society of Mechanical Engineers
Chicago, Ill.

26-30 American Institute of Electrical Engineers
Chicago, Ill.

26-30 American Home Economics Association
Milwaukee, Wisc.

September

11-16 American Chemical Society
Chicago, Ill.

13-15 Pacific Coast Gas Association
Ambassador Hotel, Los Angeles, Calif.

18-19 Canadian Gas Association
Ottawa, Ontario

18-20 American Transit Association
Stevens Hotel, Chicago, Ill.

Wk. 25 International Gas Conference and Fifteenth Annual Convention, American Gas Association
Stevens Hotel, Chicago, Ill.

October

Wk. 11 National Association of Railroad & Utilities Commissioners
Cincinnati, Ohio

24-26 American Petroleum Institute
Chicago, Ill.

Pennsylvania Gas Association

THE papers and program committee, headed by E. G. Boyer, is arranging an excellent schedule of events for the convention of the Pennsylvania Gas Association to be held at Galen Hall, Wernersville, Pa., May 9, 10 and 11. Following is an outline of the tentative program:

Registration will start at 4 o'clock May 9. The convention opens with a banquet followed by a brief business meeting and two prominent speakers, the first being Cameron Beck, manager of the personnel department of the New York Stock Exchange and the second Floyd Parsons, editorial director of *Gas Age-Record*. Entertainment including an orchestra will be provided.

An address "The Importance of the Cooking Load," by E. R. Acker, president of the Central Hudson Gas and Electric Company, will open the session on the morning of May 10. "Gas Water Heating—the Great Unsold Market" will be the

title of a message from Walter C. Beckjord, chairman of the A.G.A. Commercial Section and vice-president of the Boston Consolidated Gas Company. "The Value of the Gas Refrigeration Load," by Cyrus Barnes, chairman A.G.A. Refrigeration Committee, and general sales manager of Charles H. Tenney & Company, Boston; "The Importance of Dealer Cooperation," by Hugh H. Cuthrell, manager New Business Department, The Brooklyn Union Gas Company; and "Appliance Servicing," by H. D. Lehman, superintendent of appliance servicing, Philadelphia Gas Works Company, completes the session.

The afternoon will be devoted to golf, tennis, baseball, etc.

Alexander Forward, managing director of the American Gas Association, with another speaker of national prominence to be announced will address the evening gathering.

The following papers will be presented on the morning of May 11:

"Advertising," Leonard Ormerod; "Business Research," P. H. Myers; "Residence Air Conditioning," C. H. B. Hotchkiss; "What Is Needed to Develop the Industrial Load," N. T. Sellman, and "The Therm as a Measuring Medium of Gas," Ernest Johnson.

The convention will close with a luncheon.

Canadian Gas Association

EVERY effort is being put forward by the various local committees of the Canadian Gas Association to make the forthcoming visit of the members of the British and French gas associations to Canada next September an outstanding event in the history of the Canadian industry, and one that will be long remembered by the overseas engineers who are expected at that time.

A special program has been arranged by the Montreal reception committee for the visitors when they land in that city, and prior to the journey of the delegates to the twenty-sixth annual convention of the Canadian Association to be held in Ottawa, Ontario, September 18 and 19.

An appropriate program is being arranged for the Ottawa meeting, with some outstanding papers, contributions of vital interest to the visitors. Receptions are also being arranged by local governmental and civic authorities.

Leaving Ottawa on the evening of September 19 the party will arrive in Toronto for a one and one-half day program of events being arranged by the Consumers' Gas Company of that city.

Hamilton will be the next point of call at which point still further receptions are under way under the auspices of the local gas and coke companies, and the Natural Gas & Petroleum Association, the Dominion Natural Gas Company, Ltd., also cooperating in the extended trip through the natural gas fields of Southeastern Ontario; inspection of flowing wells, a trip to the new Welland Canal, and on to Niagara Falls, where the delegates will be taken in hand for the trip to the Hydro-Electric Power Commission Developments at Queenston under auspices of the Hydro Commission and its engineers.

From Niagara Falls the visitors will entrain for the International Gas Conference and Fifteenth Annual Convention of the American Gas Association, to be held in Chicago week of September 25, following which the party will visit several cities in the United States before sailing for home.

BOOK REVIEWS

AMONG engineering books that are of particular interest to gas utilization men is the 1933 Guide of the American Society of Heating and Ventilating Engineers. This is the Eleventh Annual Edition of this standard reference volume on heating, ventilating and air conditioning. The 1933 issue embodies 45 chapters of useful and practical information contributed by outstanding engineers in the profession.

Latest authentic information concerning air conditioning as well as heating will be found in the publication. This information supplements chapters which include practically all basic data on which the heating and air conditioning professions are founded. The design, installation and control of automatic heating systems are thoroughly covered and should be of particular interest to men connected with house heating departments of gas utilities. Chapters on cooling and dehumidifying give information upon which such systems can be designed.

The book should be useful in promoting the use of gas for heating as well as informing gas heating men of the practices of those promoting competitive fuels.

—E. D. M.

Munroe Award Coveted By Individuals in Industry

N. T. Sellman

EACH year the American Gas Association presents to the individual who has made the most distinguished contribution to the industry the Charles A. Munroe Award, a coveted distinction which is open to all gas company employees.

Under the terms governing the Award, the most conspicuous contributions to the general interests of the gas industry include research, invention, operating methods or practices which reduce cost of manufacture and distribution, improved distribution or other service, increased sale of gas, development of new uses for gas, improved public and employee relations, safety promotion, development of accounting practices, widening the field of gas-making materials, new methods of manufacture, finance, publicity, new gas works products and by-products, rates, etc.

J. L. Conover

Applications for the 1933 Award, which consists of cash and an engrossed certificate, may be made by any individual or company member of the American Gas Association and should be filed with K. R. Boyes, secretary of the Association, on or before August 1.

The applications are being entertained by a committee composed of A. J. Gonnoud, president, Kings County Lighting Company, Brooklyn, N. Y., chairman; N. C. McGowen, president, United Gas Public Service Corporation, Houston, Texas, and A. B. Tenney, vice-president, Charles H. Tenney and Company, Boston, Mass. The recommendation of this committee will be presented to the Executive Board of the Association for approval.

T. V. Purcell

The winner of the Award will be announced and the presentation made at the International Gas Conference and Fifteenth Annual Convention of the American Gas Association, in Chicago, next September.

H. H. Cuthrell

Since its establishment the Munroe Award has been presented to Nils T. Sellman, of the Consolidated Gas Company of New York, for the development and marketing of the gas refrigerator; John L. Conover, of the Public Service Electric and Gas Company, for the introduction and application of machine bookkeeping; T. V. Purcell, of The Peoples Gas Light and Coke Company, for pioneering and constructive leadership in rate making, and Hugh H. Cuthrell, of The Brooklyn Union Gas Co., for his achievements in the development of ideas and methods of dealer cooperation.

TESTING LABORATORY

A.G.A. Testing and Certification Program Expanded To Include Gas Appliance Accessories

By F. R. Wright

AMERICAN Gas Association Approval Requirements are designed to apply to complete gas-burning appliances, i.e., to equipment which is not dependent for its safe and satisfactory performance on a greater number of variables than those effecting a complete gas-burning appliance. Gas appliance accessories have never been approved by the American Gas Association except as an integral part of an appliance to which they were attached. In other words, the approval of an appliance included approval of the accessories attached thereto, but only as a part of that particular appliance, such approval not extending to the accessories as such, and not interpreted as applying to the same accessories when attached to the same appliance in any other manner, nor when used on other appliances, unless such other appliances were approved with the same equipment also. This policy has always been followed by the A.G.A. requirements committees and the A.G.A. Testing Laboratory, for the principal reason that the safe and proper performance of an accessory depends in a large part upon its location and manner of attachment.

The rigid application of this policy over a period of years has undoubtedly been beneficial to both the public and to the industry, but it has also served to work, at least, a limited hardship on accessory manufacturers. With a more general recognition of the significance of the American Gas Association testing and certification program it has become increasingly difficult for manufacturers to secure acceptance of new accessories without first having them approved as a part of an appliance. This brought about a demand for recognition of accessories as such by the American Gas Association, which demand was met by the appointment of representative and competent committees, each acting within a field for which they were specially selected, to prepare suitable standards, capable of laboratory interpretation and application, which would in a general way at least establish the suitability of design, rigidity of construction, safe and reasonably efficient performance of gas appliance accessories.

In the institution of this program, having for its aim the preparation of standards for gas appliance accessories and the testing of such accessories for compliance therewith, sight was not lost of the fact that although accessories might be subjected to rigid inspections and tests their safe and satisfactory performance, as well as their durability, might still depend upon their application to the appliance. For this reason it was felt that unconditional approval could not be given to gas appliance accessories and similar devices. A careful consideration of all factors, however, did indicate that the desired purpose could be accomplished by drafting "listing requirements" which would include Laboratory tests on the construction and performance of equipment of this type.

With the above program in mind the A.S.A. Sectional Committee, Project Z-21, A.G.A. Approval Requirements Committee appointed the following subcommittees to prepare listing requirements:

A.G.A. Subcommittee on Listing Requirements for Draft Hoods.

A.G.A. Subcommittee on Listing Requirements for Gas Cocks.

A.G.A. Subcommittee on Listing Requirements for Semi-Rigid Gas Tubing and Fittings.

A.G.A. Subcommittee on Listing Requirements for Gas, Pressure, and Temperature Control Accessories.

The preparation of listing requirements for draft hoods entailed the conduct of a large amount of research which was carried on for the subcommittee by the Testing Laboratory in Cleveland. Numerous types and sizes of draft hoods were studied, a series of performance tests developed covering all phases of draft hood operation, and a suggested vertical cone type hood developed which was capable of meeting the proposed requirements.

Tentative Listing Requirements for draft

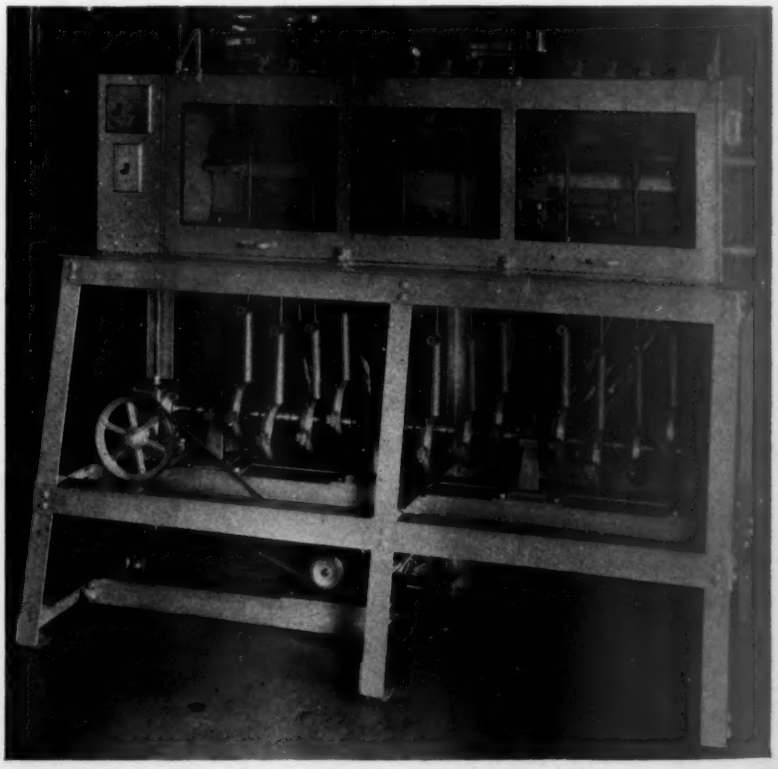


Fig. 1

Gas cock testing machine designed and built by A. G. A. Testing Laboratory

Fig. 2

Apparatus used on listing requirements for thermostats

hoods were completed, published, and distributed for criticism in December, 1932. Upon review of these requirements by the interested committees, in February, some changes were effected to make them apply more fully to both vertical and horizontal types. Although some additional time will be required before final completion of these standards it is hoped that it will be possible to have them available for distribution during the current calendar year.

Considerable progress has been made by the Subcommittee on A.G.A. Listing Requirements for gas cocks, of which E. W. Roberts, president of the Roberts Brass Company, is chairman. Specifications for gas range cocks were completed and submitted for approval by the A.S.A. Sectional Committee, Project Z-21, at its last meeting and were approved with the exception of one section, pertaining to melting temperatures. A further study of this particular subject has been undertaken by the Testing Laboratory; consequently, it is expected that full data will be available on this subject before the next meetings of the interested committees. These standards will be published in tentative form for criticism as soon as an equitable requirement for resistance of gas cocks to high temperatures has been formulated.

In the development of requirements for gas cocks, extensive research was performed by the A.G.A. Laboratory at the request of the subcommittee. A special gas cock testing machine was designed and built, by which twelve gas cocks can be tested at one time. The apparatus was developed as a means of making accelerated life tests under controlled temperature conditions. It is equipped with electric heating elements thermostatically controlled, and a small fan mounted within the cabinet by means of which practically uniform temperatures can be maintained from room temperature of 200 degrees Fahrenheit above room temperature. Figure 1 shows a view of this gas cock testing machine.

An investigation is now in progress at the Laboratory on gas cocks of various sizes and types for use on space heaters, water heaters, boilers, furnaces, etc. It is contemplated, therefore, that listing requirements for such gas cocks will be formulated as speedily as possible.

The extensive use of semi-rigid tubing and fittings for connecting gas appliances, especially in South and Southwestern States has revealed the necessity for standards for equipment of this nature. Copper, brass, and aluminum tubing is not only employed for main gas connections in numerous cases but is also widely used for pilot lines, gas line connections for control devices, etc.

While a number of codes are now available for brass, copper, and aluminum tubing, apparently none of them were prepared with the particular needs of the gas industry in mind. Semi-rigid tubing which may be satisfactory for given applications in other industries may be unsuited or incapable of giving satisfaction over a period of years when used in conjunction with gas-burning equipment.

The A.G.A. Testing Laboratory recently made a study of twelve available sets of specifications for semi-rigid tubing for the purpose of determining their application to the particular needs of the gas industry and prepared a report summarizing the principal features of these codes.

Although it was necessary to postpone the initial meeting of the Subcommittee on A.G.A. Listing Requirements for Semi-Rigid Gas Tubing and Fittings, on account of the banking situation in March, it is expected that this group will go forward with the preparation of an A.G.A. code just as soon as business conditions permit.

The preparation of A.G.A. listing requirements for gas appliance accessories designed to control the gas supply, gas pressure, and temperature, probably involved more extensive investigation and study than any other requirements recently undertaken for the reason that few, if any, specifications or codes have ever been formulated for devices of this character. The problem of investigating such equipment was assigned to the Testing Laboratory in 1932. Since that time a thorough study has been made of numerous sizes and types of pressure, temperature, and vacuum relief valves, and a report issued to the interested committee for consideration. Research on a large number of sizes and types of gas pressure regulators has also been concluded. The completion of the investigation of thermostats and electric gas control devices is also in its final stages of completion. Figure 2 shows one of the set-ups used in the study of thermostats.

In addition to the committees previously mentioned the Subcommittee on A. G. A. Requirements for the Installation of Conversion Burners has recently been assigned the task of preparing listing requirements for gas conversion units. It is gratifying to report that the A.G.A. Requirements for Installation of Conversion Burners in House Heating and Water Heating Appliances, prepared by this group, were approved as American Standards by the American Standards Association, on January 4, 1933.

The wide use of conversion burners in recent years, due largely to the tremendous expansions in the use of gas for house heating purposes, has resulted in the marketing of a large number of types and makes of conversion burners. Unquestionably some of the conversion burners used are not all that might be desired from the standpoint of design and inherent performance characteristics, while on the other hand there are a number of makes of conversion burners which, if properly installed, will not only be satisfactory from a safety standpoint but will render highly efficient performance. As a means of assisting purchases and the public in general in the selection of suitable conversion burner equipment, as well as encouraging the development of safer, more efficient, and durable burners, it was felt desirable to prepare a suitable code involving Laboratory inspections and tests of such units. The subcommittee is now engaged in the drafting of such a code.

Change in Requirements for Gas Ranges

AS the result of developments which have taken place in the design of gas ranges during the past few years, the Subcommittee on A.G.A. Approval Requirements for Gas Ranges has deemed it necessary to make the following changes in the requirements:

1. *Revise* clause "b," Sec. 20, Parts I, III, and VI, to read, "Manual top burner lighters shall provide for ignition of the gas at all top burners (simmering burner optional)" and *Add* a new clause "c" reading "c." "Automatic lighters shall provide for automatic ignition* of the gas at all top burners, simmering burners

* "Automatic ignition shall be interpreted as means which provide for ignition of the gas at a burner when the gas cock controlling the gas to that burner is turned on, and will effect re-ignition if the flames on the burner have been extinguished by means other than by closing the gas cock."

included." This addition results in changing clauses "c," "d" and "e" to "d," "e," and "f," respectively.

2. *Revise* clause "d," Sec. 8, Part II and clause "c," Sec. 7, Parts IV and VII to read, "Automatic lighters shall provide for complete automatic ignition of the gas at any burner or combination of burners, simmering burners included, within 4 seconds after the gas cock to any such burner or burners has been turned on full and for re-ignition within the same period where the flames on the burner have been completely extinguished by means other than by closing the gas cock," and *Insert* in the "Method of Test" after the next to the last sentence in the last paragraph, "The flames on the burner, with the gas cock in the completely open position shall be completely extinguished. The period of time between extinguishment and complete re-ignition of the gas shall be recorded," and *Revise,* in each case, the last sentence of the paragraphs referred to above, to read, "During the tests for ignition and re-ignition of gas from any burner, any combination of other burners shall be in operation."

3. *Revise* the ruling of June 30, 1930, concerning the Harper-Wyman type of gas cock, to read, "In the Harper-Wyman type of gas cock, means shall be incorporated in the gas cock assembly to indicate by sound or feel the intermediate 'off' position of the gas cock, except that such construction shall be optional where complete automatic ignition of all top burners, including simmering burners, is provided."

The above additions and revisions to the A.G.A. Approval Requirements for Gas Ranges (effective March 1, 1933) were approved by the A.G.A. Approval Requirements Committee to become effective May 1, 1933.

Effective Date of New Requirements

AT the last meeting of the A. S. A. Sectional Committee, Project Z-21, A. G. A. Approval Requirements Committee, held at the Testing Laboratory, in Cleveland, February 24 and 25, the effective date of all new and revised requirements, after publication in final form, was reduced from one year to nine months. Consequently, the following approval requirements, recently approved as American Standards, will become effective November 1, 1933. Manufacturers of any of the following appliances, however, are permitted, under a ruling of the Laboratory Managing Committee, to submit their equipment for approval tests under these new standards at any time they may choose.

American Standard A.G.A. Approval Requirements for Clothes Dryers.

American Standard A.G.A. Approval Requirements for Flexible Gas Tubing

American Standard A.G.A. Approval Requirements for Gas Heated Ironers.

American Standard A.G.A. Approval Requirements for Hotel and Restaurant Ranges.

American Standard A.G.A. Approval Requirements for Incinerators.

American Standard A.G.A. Approval Requirements for Private Garage Heaters.

Shortening of the period of time between the date when requirements are published in final form and their effective date was felt essential for several reasons, among them being the following:

1. New and revised editions of requirements are often obsolete in some respects by the time they become effective under the former one-year ruling due to new developments and changes in the design of appliances now being rapidly effected.

2. In many cases recommended revisions to requirements are completed and published for criticism before the original requirements become effective, resulting in considerable confusion on the part of manufacturers and other interested parties.

3. New developments and new models of gas appliances incorporating new features of design and construction often require several temporary rulings and revisions to publish requirements even before such requirements become effective.

Although recognizing the need for facilitating the preparation and revision of the various A.G.A. requirements the committee was of the opinion that to shorten the period between the date of final printing and effective date of requirements below a period of nine months might work an undue hardship on manufacturers which at this time, especially, should be avoided.

Hotel and restaurant ranges and private garage heaters may now be submitted to the Laboratory for approval tests notwithstanding the fact that the new requirements do not become effective until November 1. Manufacturers are also privileged to have their appliances tested for approval under revised editions of requirements rather than under the requirements in effect at the time their appliances are submitted, upon written notice to the Laboratory.

Change in Requirements for Central Heating Appliances

AS the result of certain developments and reported experiences under service conditions, the Subcommittee on Approval Requirements for Central Heating Gas Appliances, has deemed it necessary, after a thorough study supplemented by the results of pertinent research, to make the following changes in its requirements:

1. *Delete* Clause (e) of *Sec. 4. Pilots, Parts I* and *III,* which reads, "The main pilot line shall be connected to the main gas supply line on the outlet side of the gas pressure regulator ahead of all other control devices on the boiler (warm air furnace)."

2. *Delete Sec. 9. Fan Location, Part III,* which reads, "Furnaces which include fans as integral parts of their construction shall have the fans so placed that they discharge into the furnace casings."

3. *Add* a new section, *Sec. 9. Location of Gas Piping and Gas Controls, Part III,* reading, "Gas piping and/or gas controls shall not be located within the circulating air passages."

4. *Revise* Clause (b) of *Sec. 17. Thickness of Material, Part III,* to read, "Where sheet metal is used in the construction of heating surfaces, the thickness shall be such as to insure strength, rigidity, durability, resistance to corrosion, and other physical properties equivalent to No. 22 U.S. Standard gauge black sheet iron."

The foregoing revisions to the A.G.A. Approval Requirements for Central Heating Gas Appliances (effective Sept. 1, 1931) were presented to, and have been approved by, the A.S.A. Sectional Committee, Project Z-21, A.G.A. Approval Requirements Committee to become effective immediately.

Approval Seal Mandatory on Approved Appliances

MANY companies have expressed concern over the fact that the use of the A.G.A. Laboratory Seal of Approval on approved appliances is not made mandatory by the recently published American Standard American Gas Association approval requirements for several types of appliances, and further, because the recommended revisions to the gas range, space heater, and water heater requirements indicate that references to the Approval Seal are also to be deleted from those standards.

References to the Laboratory Seal of Approval in the A.G.A. approval requirements were deleted at the suggestion of the American Standards Association since the policies of that organization do not permit approving any code as American Standard which specifies the use of the insignia of any one particular body or institution.

In 1930, the A.G.A. Approval Requirements Committee become a Sectional Committee of the American Standards Association and, as a result, was enlarged to include representatives from the United States Bureau of Home Economics, the American Home Economics Association, the American Institute of Architects, the National Safety Council, Underwriters' Laboratories, National Board of Fire Underwriters, and the Factory Mutual Fire Insurance Companies. Since that time, seven sets of A.G.A. requirements have been approved as American Standard,

and one set as American Recommended Practice. It is hoped that eventually all A.G.A. requirements for the approval, listing, and installation of gas appliances and accessories will be accepted as American Standard.

The Laboratory Approval Seal will continue to be required on all gas appliances approved by the American Gas Association Testing Laboratory notwithstanding the fact that no references to the seal will be made in the requirements for the various individual appliances. Manufacturers of gas appliances are required by the Laboratory to agree in writing to display the Seal of Approval on all approved gas appliances, sold, displayed and/or offered for sale. In addition to this, the A.G.A. Approval Requirements Committee is now preparing a set of requirements for official marking, which will include specifications for the design and use of the Laboratory Seal of Approval, the Laboratory Approval Seal for flexible gas tubing, and the Laboratory Listing Symbol. It is expected that these requirements will be published and distributed to member companies of the Association within a few months.

Butane-Air Mixing at Laboratory

THE A.G.A. Testing Laboratory at Cleveland has in use what is believed to be one of the smallest completely automatic butane-air mixing plants in existence. The installation of this plant was made necessary by the preparation and adoption of A.G.A. approval standards for appliances designed to utilize butane-air gas.

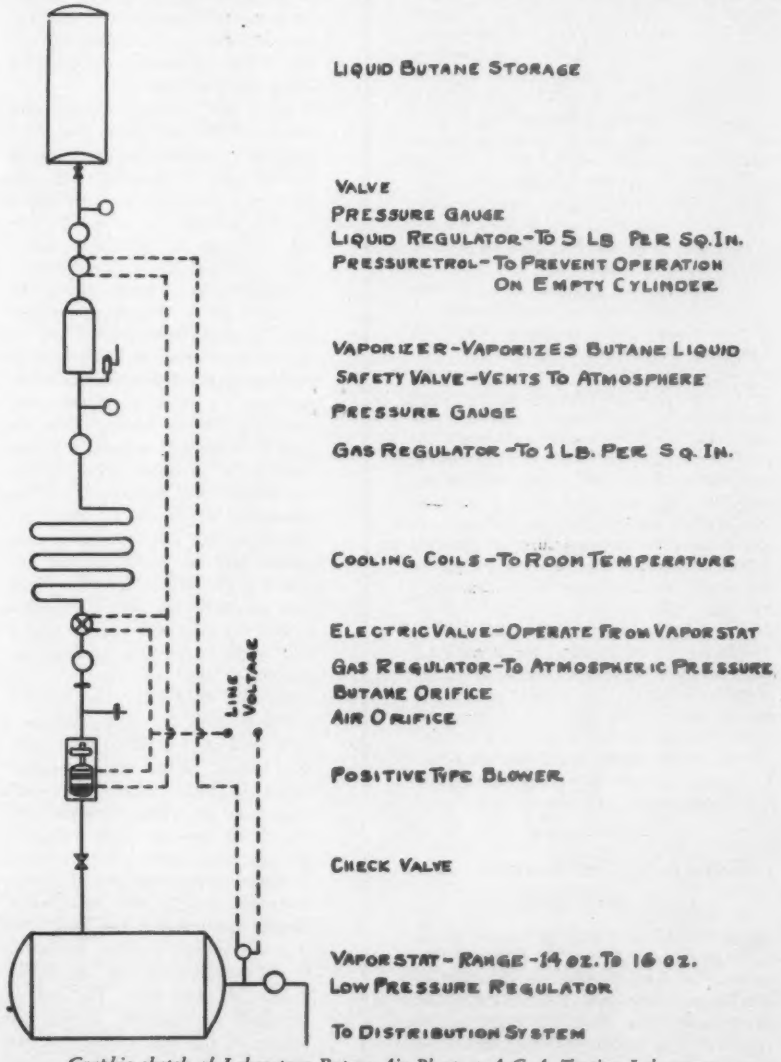
In 1931 A.G.A. approval requirements for gas ranges designed to utilize butane-air gas were completed and incorporated by the Subcommittee, in the gas range requirements. The revised gas range requirements were approved as American Recommended Practice by the American Standards Association early in 1932, and were published to become effective March 1, 1933. Since that time the Laboratory has conducted extensive research on the use of butane-air for other types of appliances, and requirements for space heaters, water heaters, and gas refrigerators designed to operate on this gas are now in process of completion by the interested committees.

In conducting the initial research on butane-air gas ranges, manually operated equipment for mixing the butane and air was employed, with one of the 5,000 cu.ft. test gas holders used for storage purposes. Upon completion of the requirements for butane-air ranges it became evident that an automatic butane-air mixing plant would be required in order to carry out routine testing. Therefore, in 1932 steps were taken to install such equipment. A survey of the commercial plants on the market disclosed that they were all too large for the Laboratory's needs, where a maximum of 1,000 cubic feet per hour would be required. Although there was no precedent to follow, Laboratory engineers were of the opinion that a successful installation could be made using small automatic equipment designed for other purposes but adaptable for use in gasifying butane and mixing it with air in the proportions desired. Consequently, work proceeded on this basis.

The butane-air plant finally developed and installed by the Laboratory is shown graphically in the accompanying illustration. It is extremely simple in construction and operation, and embodies safety features which prevent the storage of an explosive mixture within the system in case the butane supply is exhausted. It has a capacity of approximately 1,000 cubic feet per hour and is completely automatic in operation.

The general arrangement and operation of the equipment is as follows:

The liquid butane is stored in the small pressure tanks in which it is received. Butane is drawn off the bottom of the tank in liquid form and passes through a valve and union assembly which permits changing the butane tanks. The indicating pressure gauge, next in line, shows the pressure on the butane storage tank. This is followed by a liquid pressure regulator which reduces the pressure to five pounds per square inch. The Pressuretrol, next to the regulator, is an automatic electric switch which opens the electric circuit to the blower in case the pressure in this part of the system drops below five lbs. per square inch, as would happen when the supply of butane became exhausted or if the regulator failed to function properly.



Graphic sketch of Laboratory Butane-Air Plant at A.G.A. Testing Laboratory

The switch must be reset by hand before the blower will start even though the pressure for some reason returns to normal.

The liquid butane next passes into a heat exchanger or vaporizer, which, in cold weather, raises the temperature of the butane above the boiling point at five pounds pressure and converts the liquid into a gas. A pressure relief valve installed near the outlet of the vaporizer prevents the pressure from becoming too high.

The gas pressure is next reduced to one pound per square inch and the gas passed through cooling coils where the temperature is equalized with that of the air. An electric valve which controls the flow of gas is installed in the system following the cooling coils. The gas next passes through a second gas pressure regulator, which reduces its pressure to atmospheric.

A carefully designed orifice plate is installed at a point, in the line, just beyond the pressure regulator. A second orifice plate for controlling the quantity of air admitted to the system is installed in a branch line which enters the gas line through a pipe tee. The size of these two orifices definitely determines the proportions of air and butane gas which will be mixed.

The positive type motor driven blower sets up a partial vacuum at the discharge side of the orifices and draws a definite amount of air and gas through them. The blower discharges into a storage tank through a check valve which prevents the mixed gas from flowing back when the blower is not in operation.

A Vaporstat or pressure actuated electric switch is installed at the outlet of the storage tanks. The switch is connected electrically to the electric valve and the blower. The limits on the Vaporstat are set so that when the pressure in the storage tank drops to 14 ounces the electric valve opens and the blower starts, and when the pressure is increased to 16 ounces the Vaporstat automatically stops the blower and closes the electric valve. A pressure regulator on the outlet of the storage tank maintains a uniform pressure on the distribution system which supplies the gas to the various testing stations in the Laboratory building.

This plant has been in use at the A.G.A. Laboratory for more than nine months and has proven to be entirely safe and dependable in operation. The capacity of the system is adequate to take care of the needs for a test gas of this nature, and the uniformity of the mixture produced has been sufficiently constant to satisfy the strict requirements of the Laboratory.

Geneva To Get Natural Gas at Early Date

NATURAL gas will be turned in the mains of Geneva, N. Y., late in the summer or early fall, it is expected by the Empire Gas and Electric Co. which serves that city. Regulation and adjustment of appliances will be undertaken shortly.

Lower Gas, Electric and Telephone Rates?

(EDITORIAL, Reprinted from *The Sun*, New York, N. Y., April 20, 1933)

A MAYORALTY campaign is not really under way until an assault has been launched against the public utility corporations. President McKee was first in the field with a resolution appropriating $50,000 to start proceedings looking to a reduction or gas, electric and telephone rates. Mayor O'Brien said he was 1,000 per cent in favor. The $50,000 appropriation would only scratch the surface, Mayor O'Brien said. He knows well the cost of preparing a rate case. Mayor Hylan, whose Corporation Counsel Mr. O'Brien was, started a proceeding against the Edison company. It dragged along for four years.

After the Edison company had presented its testimony the Corporation Counsel occupied three months in cross-examining the witnesses. The city then subsided, having nothing to offer in substantiation of its complaint except what resulted from the cross-examination. In August, 1930, the Consolidated Gas Company asserted that it had been compelled to spend $5,000,000 in defending itself before the Public Service Commission in a period of seven years.

If the Public Service Commission is willing to entertain a rate case it is probable that all the machinery for valuation of the properties employed by the electric light, gas and telephone companies will be mobilized for the fight. While the city of New York now maintains the largest law office in the world it will require a special force of experts in law, engineering and appraisal to get ready for the trial. The $50,000 voted to start Mr. Hilly off soon will need to be fortified with other tax money. What the companies spend in their defense they will charge to operating expenses, and so in the end the consumer will pay for the expense of the contest.

What are the chances of an enforceable ruling by the Public Service Commission that will save the $25,000,000 a year, estimated by Mr. McKee to be the initial benefit to consumers? The law of the land with respect to the fair return to a public utility was declared by the Supreme Court of the United States in January, 1930. The Baltimore Street Railway was ordered by the Maryland Public Service Commission to charge a rate of fare which yielded 6.26 per cent on the agreed value of the property. It was shown that the company had borrowed $18,000,000 in nine years at an average rate of interest over 7 per cent. A return of only 6.26 per cent was held to be a deprivation of property in violation of the Fourteenth Amendment.

Justice Sutherland said that to induce the investment of capital to finance its operation the company must have a net return upon valuation not far from 8 per cent. The court announced the following doctrine:

"Sound business management requires that after paying all expenses of operation, setting aside the necessary sums for depreciation, payment of interest and reasonable dividends, there should still remain something to be passed to the surplus account; and a rate of return which does not admit of that being done is not sufficient to assure confidence in the financial soundness of the utility to maintain its credit and enable it to raise money necessary for the proper discharge of its public duties."

Probably the New York city utilities can borrow more advantageously. Consolidated Gas 5½s are quoted a little above par. Bonds of some of the gas companies and the telephone company bearing 4 per cent interest sell around par. These represent first mortgages on good security. The stocks of the gas and telephone companies have declined in price substantially owing to the reduced income of the corporations. If the proceeding which the city is about to institute is to win it will be necessary to show excessive earnings that are not reflected in current reports of the operations of the companies. Three years ago President Cortelyou of the Consolidated Gas Company declared that the combined gas and electric system earnings fell $9,600,000 below an 8 per cent return on actual investment in the property devoted to the public service. Income has fallen off as well as operating expense.

ACCOUNTING SECTION

"Share-the-Work" Programs

By L. M. Ayres

Sponsored by the Office Management Committee

"BUSINESS as usual" carried the regular employees of The Peoples-Columbia Companies through the latter part of 1929 and well into the year 1930. The shortening up of working forces during this period did not extend beyond the elimination of casual or extra labor which does not exceed ten per cent of the employee body even in normal times. Early in the last half of 1930 it became apparent that normal field operations would not be maintained through the winter and Management faced the unpleasant necessity of laying off men of one or more years' service in order to balance working hours with the work available. This problem was concentrated in the producing fields, at that time, and since there was the possibility that the following summer would bring expansion in the way of construction and repairs sufficient to furnish full time employment for regular employees, a part-time policy covering producing field and maintenance wage earners was announced on October 1, 1930, promising security of employment for the winter of 1930-31. Each unit was permitted to vary the method of application to meet the individual situation but no employee was to have less than half-time work or twenty-four hours per week. Six months passed without affecting more than one-third of the employee body and those not to the extent anticipated, they having averaged between four and five days per week.

Part-time employment in The Peoples-Columbia Companies on March 1, 1931, had not advanced beyond the emergency stage. There was no deep conviction that an industrial crisis had been reached that would require a widespread reduction in working time in order to balance the supply of labor with its demands. It was merely a relief measure which had been successfully applied against the problem of caring for our own family. We continued fighting for our own employees against the downward trend of industry with the most effective weapons at hand —security of steady employment, even if somewhat curtailed, with no reduction in wage rates; accordingly, all field and City Plant wage earners were reduced to a five and one-half day week on April 1, 1931. This move necessitated numerous transfers of employees from inactive Districts and Departments to the more active points in the organization. This work was hardly complete when the same groups suffered a further curtailment to five days per week on October 1, 1931. Employment figures for the month of October, 1931, show eighty-six per cent of all employees working five days or more per week, eight per cent working a minimum of four days per week, and six per cent working under four days per week but not below the established minimum of three days per week.

On July 1, 1932, the "Share-the-Work" program was extended to all employees, including executives. The program reduced the normal working week from six days to a maximum of five days or its equivalent with a corresponding reduction in compensation described in the announcement as follows:

"A. Casual employees on a daily rate will be paid on the basis of the time actually worked.

B. Salaried employees, including salaried wage earners, now on a five and one-half day schedule, will go on a five day basis with a reduction in pay of one-eleventh.
To the utmost extent practicable, those now working more than five and one-half days per week will go on a five day basis, with corresponding salary reductions. However, this reduction to a five day basis shall not affect salaries of $100 or less per month, nor result in a reduction below $100 for those receiving more than that amount.

C. Executives and other salaried members of Management will receive a reduction of one-eleventh in their pay, even though continuing responsibilities make an actual five day week impossible.

D. All reductions in compensation will be effective currently on the payroll even though the time off is taken in one or more periods."

Departments and Plants having surplus employees after the reduction to five days were instructed to avoid layoffs by making further reductions in the time schedule with further reductions in pay, but in no case were employees to be reduced to less than fifty per cent of full time or three days per week.

Among public utility companies which recently reported on the methods used—sixty are reducing days per week; seventeen are reducing the number of hours in the working day; six are shortening shifts; nineteen are alternating shifts; twenty-one rotate days off. Many companies use more than one method, applying to the individual department the method best adapted to operating requirements.

A western gas and electric corporation has now placed its gas service department on a five day week and its electric service and construction departments are working on an average of one week off in ten.

In January, 1932, a western gas and electric corporation made an analysis of its married women employees. As a result of this analysis, one group has been replaced; a second group has been put on half time; and the remainder still have full-time employment. This action resulted in placing 100 new employees on the payroll, each of these being selected because of his or her need for employment.

A southern utility company, due to the falling off of new construction work, found it necessary early in 1932 to either lay off employees in the Street Department or adopt a part-time system. In order to hold the organization together, a stagger system was put into operation —the men working one week on and one week off. During the summer months, however, the company was able to give the men almost straight time employment due to several municipal projects. When this work was completed, the Street Department returned to the week on and week off schedule.

There are six methods commonly employed in spreading available work among as many people as possible:

1. Reduction in days per week.
2. Shortening the working day.
3. Shortening the working shift.
4. Alternating individuals or groups on the same work.
5. Rotation of days off.
6. Extended vacations or furloughs.

The application of the "Share-the-Work" program in The Peoples-Columbia Companies may be summarized as follows:

General Office. Entire office force on a five day week basis including executives. Saturday is considered the day off. Employees required to work on Saturdays in emergencies receive their time off during the week. Normal payroll losses due to retirements, deaths, and resignations, together with one-half days' reduction in weekly working time, have approximately balanced the work. No office employees have been reduced below the five day working schedule.

Collection and Field Offices. Open 8:30 A.M. to 5:00 P.M.—five days per week, and 8:30 A.M. to 1:00 P.M. Saturdays —retain fifty per cent of working force on duty Saturday mornings. Those working five and one-half days one week have four and one-half days the following week with Friday afternoon and Saturday off.

Sales and Service Department. Maintains five day week schedule with Saturdays off, if possible. Essential work and emergency jobs which must be carried on require variations in the regular schedule. The accumulated time off is ordinarily taken the following week, but extreme cases have arisen deferring time off until several days have been accumulated.

Street Department. Maintains the usual emergency service seven days per week although operating on a maximum five day week basis. Crews working Monday to Friday have Saturday and Sunday off; Tuesday to Saturday, Sunday and Monday off, maintaining as nearly as possible a five days on two days off schedule. When operating below a five day week schedule, the same plan is followed reducing the days on and increasing the number of days off.

Producing and Transmission Departments. Have suffered the greatest curtailment in operations. They are working a maximum of five days per week with certain units falling as low as half-time or three days per week for temporary periods. Saturdays and Sundays are the established days off in field operations. Shift men are on five days and off two with rotating rest days. Emergency time exceeding five days per week is accumulated and allowed the following week.

The Companies' Industrial Representation Plan, which has functioned successfully since 1926, provides a means of contact between the Management and every employee through representatives elected annually by the employees, on a general basis of one Employees' Representative to every fifty employees. These elected Representatives, meeting regularly, with an equal number of Management Representatives, for collective action on all matters of mutual interest, have been closely in touch with the "Share-the-Work" movement and have given their unqualified approval and support to the Plan. As one Employees' Representative recently expressed it, "We have found that a lot of work can be done on a five day week and we can do a lot of living on five days' pay." Managements' duties and responsibilities have been increased but the plan has functioned more smoothly than expected and results have more than balanced the extra effort.

The policy has successfully stopped lay-offs, has added a limited number of new employees, has saved the jobs of 265 people and has not increased the total payroll.

SHARE-THE-WORK EXPERIENCE

Employees of The Peoples Natural Gas Company, The Columbia Natural Gas Company
June 1931 – February 1933

Date	*Working More Than 5-Day Week*	*Working 5 Days Per Week*	*Working 4 Da. But Less Than 5-Day Week*	*Working 3 Da. But Less Than 4-Day Week*	*Gain or Loss Total Employees Over 6-Mo. Period*
Oct. 1931	56%	30%	8%	6%	3.9% loss
Dec. 1931	69%	12%	14%	5%	No change in 3 months
June 1932	59%	6%	25%	10%	1.2% gain
Dec. 1932	None	63.5%	22.5%	14%	.7% loss
Feb. 1933	None	61%	28%	11%	.3% gain

Observation of Contact Employees

By Charles Scott

Sponsored by Customers' Relations Committee

THE cultivation and maintenance of good relations with the public by an industrial organization is dependent in a large measure upon the training effort which has been expended upon those of its employees who come in daily contact with its customers.

A utility desirous of reaping the benefits which flow from the possession of the public's confidence and good will must first impart to its employees, by a systematic application of principles and methods in both guidance and instruction, the requisite knowledge of its business policy.

In the gas industry educational schemes have been prepared by the American Gas Association, for adoption by member companies, in training their employees for customer contact work and considerable time, energy, and money have been spent in this educational effort.

Exceptional care has been exercised by Employment and Personnel Officers in the selection of new employees and in their development. Working conditions have been improved, welfare programs adopted, and office equipment modernized, all with the view of inculcating in the mind of the employee the importance of his enhancing good will by properly representing the company and by maintaining a friendly attitude toward the company's customers.

Yet how many companies have established a method of observation over their contact employees to insure that the time and money spent in their training has not been in vain?

Recently an investigation was made, through the combined efforts of a number of research bureaus, to find out why customers are lost to retail stores. It was found that thirty-one per cent of all the customers lost by retail stores were lost because of indifference of salespeople; ten per cent were lost because of lack of tact in handling customers; seven per cent because of insolence on the part of the salespeople; and five per cent because of failure to recognize the customer.

From this report it might appear at first glance that the average run of employees are indifferent to their employer's interest.

As a matter of fact the employees are anxious to do what is right and quite naturally desire appreciation if they succeed. In the production end of our business we employ skilled mechanics to watch the intricate machinery to see that it functions properly. Similarly we should not leave the employees, who meet the public, to their own resources and ingenuity, but rather should we provide, not only an adequate organization for their proper training, but also a method of supervision and guidance for the employees in the performance of their daily tasks, if our relations with our customers are to remain tranquil.

One large gas company has evolved a method of service sampling which is worthy of our consideration. By this means the practical application of the employee's effort is brought forcibly to light. During the day fictitious orders are telephoned to the customers' order department for the purpose of testing the quality and efficiency of the service. The journey of these orders through the successive steps in the routine is carefully watched to determine whether the operations called for have been performed according to schedule and with what degree of completeness. But we must admit that much can pass between the customer and the employee that will not be registered on the order and in this way service sampling does not reflect the whole story.

If we are to know what is taking place in contact work other than that which is recorded on the order, then we must employ some other method to produce the tangible evidence. In this connection the Service Observation Plan of one public utility company is of more than passing interest. A number of stenographically trained observation clerks are employed, who, through the medium of a Monitor for telephone work and a Microphone for counter work, are able to record the full text of the conversation taking place between the customer and the employee. The service observation reports are later transcribed and typewritten, analyzed, and rated for efficiency. The reports are very complete having in all forty-two classifications, under the following sub-divisions:

Incorrect information, incomplete information, failure to take effective action, improper announcement or closing, objectionable phraseology, failure to express thanks or regrets, discourtesy, improper manner, slow attention, delay during contact and cases not closed.

The service observation recording forms are forwarded to the department supervisor for observation and study. Each month the Observation Department compiles a special service observation summary of the work under the following headings:

Service failures, irregularities, cases not closed, service order errors, service observations, and sales information.

This monthly report is discussed at a meeting of the Department Superintendents, at which time all phases of the contact work are thoroughly studied with a view to the betterment of the service.

The work of the Observation Department is not viewed with any feeling of suspicion or distrust. On the contrary, superintendents welcome the unbiased reports for the enlightenment and assistance which they offer.

The company reports that the existence of the Observation Department has had a steadying effect on the service generally and that the cost of the work is fully justified by the disclosure of weaknesses in the routines and the quite evident desire on the part of the employees to cooperate with the company in maintaining public good will.

There are no specially defined rules under which this observation work is directed and it does not interfere in any way with the general routines of the business.

To Report on Preservation and Destruction of Records

A MEETING of the Eastern Subcommittee of the General Accounting Committee on Preservation and Destruction of Records was held in the offices of the Equitable Gas Company, Pittsburgh, Pa., on March 31, with the following members present:

F. B. Saunders, chairman, Philadelphia Company, Pittsburgh, Pa.; F. J. Bischoff, Consolidated Gas Company of New York, New York, N. Y.; C. E. Eble, Consolidated Gas Company of New York, New York, N. Y. (by invitation); W. F. R. Munnich, Philadelphia Electric Co., Philadelphia, Pa.; John A. Curry, Philadelphia Electric Co., Philadelphia, Pa. (by invitation); M. F. Reeder, chairman, General Accounting Committee, The Peoples Gas Light and Coke Co., Chicago, Ill., and H. W. Hartman, secretary, New York, N. Y.

The committee discussed a preliminary draft of report which was revamped for final reporting at the convention. In the report there are brought out the various rules and regulations covering the preservation and destruction of records issued by a number of regulatory bodies, as well as the thought and ideas on the part of committee members. The report also suggests a method or system in accounting for records to be preserved, and those to be destroyed, outlining the authorizations for such action, and method of recording such information so that at all times a complete inventory of the records on hand and the records destroyed is available in the proper executive offices.

Most Heroic Act To Be Recognized By Medal

APPLICATIONS for the Meritorious Service Medal, one of the most cherished awards made annually by the American Gas Association, now are being received at Association Headquarters, 420 Lexington Avenue, New York, N. Y. This medal is presented to the gas company employee who is judged to have performed the most heroic act within the industry during the twelve-month period from July 1, 1932, to June 30, 1933.

Applications will be received this year until August 1, according to announcement made by Alexander Forward, managing director of the Association. Application forms will be furnished on request.

This award was established in 1923 through the generosity of the late Walter R. Addicks, former senior vice-president of the Consolidated Gas Company of New York, and it has been the means of honoring brave deeds that might have otherwise gone unrecognized. Each gas company executive is requested by Major Forward to find out whether one of his employees is eligible for consideration in this distinction. The Award not only honors the employee but the company as well.

Conditions under which this Award is made are as follows:

"Not more than one medal to be awarded annually for a period covered by the prior calendar year provided a meritorious act was performed.

"Award by and with the authority of the Executive Board as now constituted or any successor governing body of the American Gas Association, or its successor.

"Only to one who has shown meritorious and conspicuous judgment, intelligence, or bravery in saving human life either in the plant or works of any gas undertaking or having to do with the handling of the materials of manufacture or of the products manufactured or distributed.

"Any loyal citizen of the United States, without regard to age, sex, race, religion or political affiliation, shall be eligible for an award, provided, however, he was at the time of the occurrence regularly in the employ of, or an officer of, a member company, or was at the time an active or an associate member of the American Gas Association or of its successor; and provided further that, where a member or company member is located outside of the United States, then the requirement regarding loyal citizenship shall apply to similar allegiance to the country in which such member or member company may be located.

"An award may be made, if the Executive Board so order, in memory of one who, if surviving, would have received such award, provided there be a widow, father, mother, son or daughter surviving, to receive custody of such award.

"The Executive Board of the American Gas Association may at any stated meeting make any regulation or requirement governing an award not inconsistent with the foregoing requirements."

Revised Syllabus of Home Study Course Available

The A. G. A. Committee on Education of Gas Company Employees announces that Part I of the revised syllabus in the Columbia University Home Study course on Manufactured Gas is now available. This is based upon the revised edition of Professor J. J. Morgan's book "American Gas Practice, Volume I, The Production of Manufactured Gas." It is expected that the Part II of the revised syllabus, based on Volume II of Professor Morgan's book and dealing with the distribution and utilization of city gas, will be ready near the end of the present year.

In connection with the revised syllabus a change in the method of enrollment has been made. As previously, the enrollment fee for the complete course, Part I and Part II, twenty-four lessons, is $60 to members of the American Gas Association or employees of company members. Under the new plan it also will be possible for a man to enroll for either Part I or Part II of the revised course. The fee in this case is $45 for the twelve lessons of either part.

The total enrollment in the course based on the original syllabus numbered 1643. It is hoped the revised course, which has been brought up to date and includes considerable material not contained in the original course, will be of service to the gas industry in like measure.

Special information regarding the course may be obtained from Kurwin R. Boyes, secretary, American Gas Association, 420 Lexington Avenue, New York, N. Y., or Professor J. J. Morgan, Home Study Department, Columbia University, 15 Amsterdam Avenue, New York.

COMMERCIAL SECTION

To Announce Plans for Sales Promotional Campaign Next Month

FINAL plans of the American Gas Association looking toward the inauguration of a concerted promotional activity to overcome destructive economic and competitive forces by increasing the advertising and sale of appliances will be announced next month, it is expected. This announcement was made by C. N. Lauer, chairman of the A.G.A. National Directing Committee of Executives.

In an address before the New Jersey Gas Association at Camden, Mr. Lauer reviewed the program which his committee will introduce to the entire gas industry as soon as possible.

The purpose of the campaign is to coordinate the sales and promotional policies of all local gas utilities into a nationally unified and highly organized method of telling the public about the efficiency and economy of modern gas appliances.

Commenting upon the plan, Mr. Lauer said:

"There has been much emphasis placed upon the fact that particularly in the domestic appliance field our competition, both present and potential, arises from groups which are aggressive in their sales tactics and united in a concerted drive to displace gas with other fuels. It has been pointed out repeatedly that while most of our gas company organizations are aiming at the same objectives, we are dissipating a lot of energy in divergent directions and, in the meantime, running into more and more highly coordinated and developed competition from various sources.

"Nobody believes that it is possible to standardize the practices of the member companies in developing the sale of gas but there certainly has been evident a feeling that more aggressive and better coordinated sales policies are essential to the gas industry today.

"The National Directing Committee of Executives proposes not only to set up a measure of what promotional expenditures are adequate under present competitive conditions to insure preservation and development of its sales, but will also make the strongest possible efforts through its regional membership and in every other way to bring home to the operating executives of each company the necessity for adequate financial and executive support of sales development measures and secure their committals to these expenditures.

"To make these efforts successful we are now preparing a comprehensive advertising and sales promotional program for local company or regional use in advancing the use of gas in the home. The program will not supplant but will supplement and round out the present advertising and sales activities of member gas companies.

"It is obvious that the preparation of a program of this character demands the attention and experience of the best sales and advertising talent both within the industry and without. To this end the committee has requested and is receiving the full support of appropriate sales and advertising personnel of the industry and in addition has engaged a qualified advertising agency to work under its supervision and guidance in formulating the final program to be announced in June."

With the whole-hearted support which has been given to the committee's plans by members of the Executive Board of the American Gas Association, Mr. Lauer predicted that the gas industry may look forward to a new era of sales development in the near future.

Among the more important phases of the proposed national program are provisions for surveying all customers' appliances to determine age and efficiency; surveys of local rate situations in relation to competitive fuels, training of gas company employees to carry the story of modern gas service to the public, and further development of dealer cooperation in the sale of domestic gas appliances.

All Battle Creek Mourns Loss of Service Engineer

Fred L. Shanahan

WHEN Fred L. Shanahan, house heating service engineer of the Battle Creek Gas Company, died April 9, Battle Creek, Mich., lost a patriotic citizen and beloved figure.

Mr. Shanahan held no high office in his community; his name was never used to boost a civic undertaking; his influence at the banks was, perhaps, negligible. He was a man of rather slight build and his manner was unassuming.

Yet his funeral April 12 was attended by a remarkably large group of mourners sharply divided between relatives and associates on one hand and those who had formed an attachment to him far greater than he knew. There was an outpouring from the financial and social walks of life that would have done credit to those who had been conspicuous figures in the public eye over a long period and had wielded a mighty influence.

Mr. Shanahan was probably one of the ablest exponents of that luncheon club slogan, service, in the city's history. He was personally known to literally thousands of residents through his long and active association with the gas company.

Mr. Shanahan would enter a house. If there was some dislocation of furniture because of some gas trouble, Shanahan would first attend to his strictly technical duties. Then he would arrange the furniture. If, in the operation, there was some deposit of dirt or shavings, he would clean that up. He looked carefully to see that there were no stains, no grimy handprints. If an artisan who preceded him had left them, Shanahan would take care of that, too.

A woman was moving some furniture out to a summer cottage and she had an engagement almost immediately. The furniture men, walking across a tarred road, had left footprints on the carpet. The woman was plainly in a panic. Mr. Shanahan was there. "Have you some gasoline around the house?" he asked. There was none. "I'll siphon a little out of the car," he said. He got the gasoline and, on hands and knees, he scrubbed the footprints from the carpet. "I simply must pay you," the woman said. "Please don't offer to," he answered, "it is a part of the gas company service."

Mr. Shanahan's advice was eagerly sought on matters that ranged from the most economical installation of a shower bath to proper grass seed for the lawn. A woman had closed her home and had gone south for the winter. The usual

worries beset her. Was the water turned off? Were plants freezing? Had lights been left burning? Had there been burglars?

"Well, there's only one thing to do," she told her husband. "We'll write Mr. Shanahan. If he'll drop around I'm sure everything will be all right."

A gas company official commented that Mr. Shanahan's service to the public would serve as an example for all to follow.

Mr. Shanahan was always good natured. He didn't pass his own troubles on to the gas company patrons, but he had troubles, plenty of them. Even in the closing days of his existence his family was besieged by an unusual amount of sickness and surgery. But he never lost his smile, his cheery word, his desire to help others.

Air-Cooled Electrolux Enthusiastically Received

REPORTS from various sections of the country indicate that the air-cooled Electrolux has met with instant success wherever introduced.

In Brooklyn, N. Y., The Brooklyn Union Gas Company has been gathering in order after order for the new ice boxes. Starting on the first day the latest appliance was introduced the new business department ran up a total of eighty-seven sold and this figure mounted to 243 as the week closed.

B. H. Gardiner, director of sales of the Columbia Engineering Company, Columbus, Ohio, reported that on April 17 his company had ordered six carloads for the Columbus properties and four carloads for the Pittsburgh area, a total of ten carloads.

According to C. R. Logan, Philadelphia Gas Works Co., the Quaker City "has accepted air-cooled Electrolux beyond expectation." He said, in a telegram to Electrolux Refrigerator Sales, Inc., New York, on April 15: "First four cars sold. Rush next three. Other orders follow."

At the National Capitol, Electrolux met with enthusiastic welcome. The introduction of the air-cooled model was made at a dinner and demonstration at which leading architects and builders of the city were guests of the Washington Gas Light Co.

F. E. Sellman, vice-president of the Electrolux Refrigerator Sales Corporation, of New York, spoke, as did Marcy L. Sperry, president of the Washington Gas Light Co.; Everett J. Boothby, vice-president and general manager; Wilton J. Lambert, counsel; Henry M. Brundage, sr., senior vice-president of the Consolidated Gas Co., of New York, and Henry M. Brundage, Jr., his son, general sales manager of the Washington Gas Light Co., who was toastmaster.

Music was furnished by the Washington Gas Light Co. Orchestra, and handsome combination fountain pens and pencils were given as souvenirs.

Other reports of enthusiastic receptions of the new model at other points throughout the country daily are reaching Electrolux headquarters.

Miniature Automatic Gas Refrigerator

THE Consolidated Gas Company of New York has donated a model of the automatic gas refrigerator, shown above, to the East Harlem Health Center of the New York Tuberculosis and Health Association. The model, which is an exact scale reproduction, will be used by the Center in its lecture work on the proper methods of preserving perishable foodstuffs. It is completely equipped with imitation bottles, packages, meats, fruits, and vegetables.

R. S. Products Changes

The R-S Products Corporation, of Philadelphia, Pa., has executed an agreement with Ryan, Scully & Company, whereby all Ryan, Scully & Company products will be manufactured, sold and installed by the former corporation. G. F. Beach, chief engineer, and F. J. Ryan, President, are associated in similar positions with the R-S Products Corporation.

Distributors Appointed

The Gas and Electric Heater Co., La-Porte, Ind., manufacturers of FauceHot Self-Operating Gas Water Heaters and Converto Conversion Burners announce the following appointments:

Herbert H. Skinner, manufacturers' agent, Boston, Mass., as distributor of Gas and Electric Heater Co. products in the New England territory, and Norman J. Griffiths, Newark, N. J., as distributor of Gas and Electric Heater Co. products in the Metropolitan area of New York.

INDUSTRIAL GAS SECTION

E. L. WILDER, Chairman C. W. BERGHORN, Secretary F. B. JONES, Vice-Chairman

Oil vs. Gas-Burning Ranges

By C. H. French*

Standard Gas Equipment Corporation

EVERY few years there crops up a splurge of activity to introduce oil burning ranges for commercial cooking in restaurants, hotels, clubs, hospitals, and institutions where cooking is done in volume. The idea has not been very readily accepted especially so by those who manage and operate busy kitchens, where quality food has to be prepared speedily, properly cooked and at as low a cost per meal served as is possible.

Great claims are made by some oil range manufacturers, as to low fuel cost, fast operation, uniform temperature distribution both in the ovens and cooking top—less food shrinkage due to unvented ovens, and that they are odorless. Mention has been made that oil ranges can be operated without wicks, weights, springs, or other complicated mechanisms. This latter statement is rather vague, as ranges using other fuels do not have these things to contend with.

Regarding fast operation—the oil range manufacturer does not state clearly what is meant by fast operation—so there is some doubt as to how long it takes to heat up the cooking top and oven, starting from room temperature to a suitable heat to do general cooking, as compared to the speed of other fuels.

If it is claimed that articles are cooked faster with oil than with other fuels, then it is not consistent, as it is heat or temperature that does the cooking regardless of the kind of fuel used, and if the desired degree of heat is not easily obtained and controlled, it fails to meet the needs of the chef that really understands foods and the art of cooking them. A well-known chef once made the statement that there was almost as much good food spoiled by improper cooking than was served and eaten, so in reality, cooking is an art and it would not be far amiss to say it is a profession.

Therefore, the person doing the cooking must have a fuel and also a cooking apparatus which is flexible to the extent of being able to instantly increase or decrease at will the heat or temperatures required, not only in the ovens but especially so for top cooking.

A cooking top which has approximately the same degree of heat over the entire cooking surface is not desirable. Chefs will state that a cooking top should have considerable variation in degrees of heat. There must be one spot or point where extreme high heat is available and then graduated lower temperatures running away in all directions from this high temperature spot.

*Member Hotel, Restaurant and Food Products Committee, Industrial Section, American Gas Association.

Accuracy Is Necessary

Certain foods to be cooked have to be started at a high heat and gradually moved to places on the cooking top where the heat is less. Then again, other foods are started at a low temperature and gradually moved to higher heat zones.

Cooking accuracy is necessary in the preparation of special dishes and the chef must have available at all times, just the proper temperatures he requires for the work in hand. Undoubtedly, the new modern heavy solid top gas burning range with insulated oven and thermostatic heat control is the most flexible for accurate cooking.

There are several types of oil ranges—some requiring two electric motors, one to pump oil from the tank to range, and the other to provide air for combustion. Another type is that known as the gravity system. Even with the gravity type it is necessary to use electric pumps to bring oil up to the tank if kitchen is located on an upper floor of the building, or where the tank has to be located outside the building.

The cost of motors and tanks, electric current, repairs to motors, and pumps are all chargeable to an oil range installation and should be figured in the cooking cost. Usually where oil fuel is used in a kitchen, special flue and ventilating conditions have to be considered. This generally entails considerable expense.

An interesting summary of capital and operating charges pertaining to one of the many actual installations of oil ranges which were replaced with gas equipment of the modern, thermostatically controlled type, is given herewith:

Since the gas installation was made there has been greater uniformity of product, especially in roasting operations due to the thermostatically controlled ventilated ovens of the ranges—shrinkage is reduced to a minimum by controlled temperatures. Refrigeration cost lessened due to lower room temperatures. Recording temperature chart showed kitchen temperature of 117° on the morning of October 22 with the oil ranges in operation and a temperature of 85° at the same hour on the morning of October 24 with the gas ranges in operation.

High kitchen temperatures reduce the efficiency of employees and make working conditions unbearable.

Disadvantages of Oil

You have probably been advised of the few advantages which oil possesses, but let us mention some of the disadvantages in its use for cooking operations:—

1. Necessary to maintain range hot throughout entire operating period in order to take care of short order work. Otherwise the heating-up time would be too long.
2. The continued operation of the range tends to make the kitchen disagreeably warm during hot weather unless sufficient ventilating facilities are installed.
3. When much ventilating equipment is provided, special care is necessary in design and operation to eliminate trouble from pressure changes due to action of these fans. It is quite possible to cause back drafts and to distribute products of combustion into the room when the fan is running.
4. There is only one burner. Consequently oven temperature cannot be readily controlled except by damper

	Oil Installation	*Gas Installation*
Make of ranges (well known)	—	—
Number of units	1-4 oven 1 fire	4 sections
Initial cost	$1700.00	$800.00
Annual fuel cost*	408.00	554.04
Annual power cost*	84.00	—
Annual motor repairs*	24.00	—
Annual repairs—range tops*	127.80	40.00
Annual interest on investment (6%)	102.00	48.00
Annual depreciation (6%)	340.00	160.00
	$1085.80	$802.04
Annual saving of gas operation over oil		$283.76

*The above figures taken for actual money spent according to invoices paid.

manipulation. If the top heat is turned down the oven will not be sufficiently hot. If the top is going full, the oven is likely to become excessively hot.

5. The continued operation of oil and higher flue temperatures set up a greater fire hazard from vent connections from oil stoves, increasing insurance rates in some localities.
6. The usual disadvantages of oil storage.
7. Electric motors. The latter operating in a commercial kitchen are subject to considerable service problems because they tend to gather dirt and grease. If a grease-proof type of motor is used, additional expense must be recognized.
8. Since oil equipment is only available for the range, other kitchen operations must be performed on gas. This includes coffee urns, broilers, toasters, stock pots, etc.
9. From an operating viewpoint, the existence of two fuels in a commercial kitchen, with entirely different igniting and operating requirements, is unsatisfactory. The operators become confused on handling two types of units. It is well known that the use of more than one kind of fuel in a kitchen is always more expensive.
10. Tied up with the problem of ventilation is the possibility of oil odors penetrating into equipment and around the kitchen. This can be very annoying, especially in hot weather and doubly true if leakage should occur, spilling oil onto the floor or equipment. This, regardless of claims made that oil is odorless.
11. A slightest misadjustment of the oil burner will cause soot to deposit in the flues surrounding the oven. These are not usually accessible and will eventually close up in part, or at least cause a decrease in the oil operating efficiency.
12. Repairs and replacing of range tops excessive.
13. The excessive uncontrolled heat distribution requires much more shifting of utensils than is the case with gas equipment.
14. The heating-up time of the ovens, especially at the start of cooking, is longer in the case of oil because it depends on the rather low-temperature flue products available for oven heating.
15. The bare fuel cost in the case of oil must be clearly recognized as only part of the operating cost. Not only must all of the items mentioned be considered, but a tangible value should be given to the greater speed, comfort and assurance of continuous service which gas offers.
16. The price of oil is not stable but fluctuates from year to year or from one season to another. Gas rates are generally constant, and as a matter of fact, the gas rates in the past few years have been decreasing.

Restaurants Return to Gas

The disadvantages quoted, together with such miscellaneous extra costs mentioned, have caused a number of restaurants, which have been persuaded to use oil ranges, to discard them and return to gas. Let us quote the viewpoint of the management of a nationally known chain of restaurants in Chicago, as follows:

"After exhaustive tests and experiments as to the best fuel for restaurant cooking, we have removed the oil units which we had installed and have decided that gas is the fuel par excellence for restaurant kitchen operation.

"The points strongly indicated for the exclusive use of gas as fuel were that it does not create excessive heat—that it is consistent in operation—does not entail high maintenance—is easy to control, due to thermostatic regulation, and through insulation of units—that food output is certain and uniform—and that the normal ventilating system can be utilized with satisfaction, as installed.

"It must be remembered that in the normal run of kitchens, where gas is employed exclusively, as a fuel, we find its application in broilers, salamanders, coffee urns, steam tables, bain maries, waffle irons, griddles, toasters, deep fat fryers, water heating, and steam generating.

"So it is seen that in such cases only 30 to 40 per cent of the fuel consumption is in gas ranges.

"Having experienced such disadvantages as excessive heat, high maintenance cost, and lack of control, we deemed it wise to return to the exclusive use of gas, with its present-day features of automatic control, thorough insulation, and burner improvement."

About Shrinkage

Some oil and electric range manufacturers state that with the use of non-ventilated or box type ovens, the shrinkage of meats and other foods is far less. Statements or propaganda of this character apparently do not stand as being correct when viewing tests and data prepared by those who are considered an authority on the subject.

1. It has been definitely established that shrinkage increases with the oven temperature used.
2. The type of oven or the fuel used does not alter the result as to amount of shrinkage.
3. Shrinkage varies widely with the cut of meat and the amount of fat present.
4. Shrinkage increases with the time of exposure to oven heat to a "degree of doneness."
5. Apparently the quality, flavor, color and texture of roast meat, as to being good or bad, depends greatly on the person doing the cooking.
6. Shrinkage is caused by the loss of moisture contained in meat when heat is applied and depends on the temperature existing in the oven.

Further in regard to shrinkage of meats, taking the data and tests made in various laboratories, colleges and bureaus, this question of shrinkage when all is said and done, depends entirely on the class and kind of meat used, as to the percentage of shrinkage per pound of meat cooked and it depends upon the chef or the person cooking the meat, as to how close the oven temperatures are watched—the time that the meat is allowed to remain in the oven—the amount of basting and turning of the roast during the cooking period.

Where thermostatic oven temperature controls are used, less actual watching of the meat being cooked is required and more accurate cooking is obtained.

Referring back again to Oil versus Gas as a fuel for use in heavy duty ranges, the case referred to above where it shows figures of the annual saving in a Chicago restaurant by the use of gas over oil, is very small in comparison to many other known cases.

There is no question but when all of the facts are taken into consideration as regards oil fuel against gas, that the conveniences, cleanliness, safety, flexibility and simplicity of operation of gas burning equipment, certainly puts gas appliances and gas as a fuel, far to the front as being the best.

Metropolitan Industrial Gas Sales Council Meets May 17

THE sixth annual general meeting of the Metropolitan Industrial Gas Sales Council will be held on May 17, at the St. George Hotel, Brooklyn, N. Y. A registration fee of $2.50 will be charged.

This yearly gathering is attended by the members of the council and industrial salesmen of the metropolitan area. Any gas utility industrial representative will be welcome.

Program Morning Session

10:00 A.M. Address by Chairman J. F. Quinn, Brooklyn Union Gas Co., Brooklyn, N. Y.

10:15 A.M. Large Volume Cooking and Baking. R. H. Staniford, Brooklyn Union Gas Co., Brooklyn, N. Y.

10:55 A.M. A New Sales Outlet in the Neighborhood Laundry. J. A. Malone, Consolidated Gas Company of N. Y.

11:20 A.M. Are Industrial Gas Developments Keeping Pace With our Competitors? E. D. Milener, American Gas Association, New York City.

11:45: A.M. Sales Activities and Accomplishments. J. P. Leinroth, Public Service Electric & Gas Co., Newark, N. J.

12:45 P.M. Luncheon.

Afternoon Session

Round Table Discussion

2:00 P.M. Discussion of Large Volume Cooking and Baking.

2:40 P.M. Discussion of A New Sales Outlet in the Neighborhood Laundry.

3:10 P.M. Discussion of Sales Activities and Accomplishments.

4:10 P.M. Discussion of Research Activities.

4:30 P.M. Closing Remarks.

Harry H. Richman

HARRY H. RICHMAN, who had been district manager of the Welsbach Company, Gloucester, New Jersey, since 1929, died March 21, at his home in Philadelphia, after an illness of several months.

Mr. Richman has been in the employ of the Welsbach Company continuously for 38 years. Prior to 1929 he was assistant manager of the South Atlantic Coast wholesale department.

He served on several American Gas Association committees and at the time of his death was a member of the council of the Pennsylvania Gas Association.

He is survived by his widow.

Joins Panama Company

NORDEN R. JONES, for the past four years with the gas consultation department of the Electric Bond and Share Company, especially identified with its foreign properties in Panama, Colon, Havana and Brazil, has accepted a position as gas engineer with the *Compania Panamena de Fuerza y Luz,* at Panama.

Mr. Jones has been employed in the gas industry twenty years, having served the following companies: Utica Gas and Electric Co., Providence Gas Co., and Malden and Melrose Gas Light Company.

Journal Makes Bow in New Dress

The April issue of the "American Gas Journal" provided a pleasant surprise to the gas industy with its appearance in a new cover design, and improved typography, additional departments and features. The style has been improved by the use of informal line drawings and historical highlights have added much to its readability and general attractiveness. In addition, the editorial scope of the magazine has been considerably widened.

The editors and publishers of the "American Gas Journal" evidence their faith and confidence in the future of the gas industry by inaugurating these improvements at this time.

NATURAL GAS DEPARTMENT

New Natural Gas Pool Opens in Michigan

THE first important natural gas development in the Central Michigan area in more than a year came on March 17, 1933, when gas was struck in James M. Taggart's wildcat, J. H. Barton No. 1, in the southwest quarter of Section 11, Austin township, Mecosta County.

This well was completed at a depth of 1,485 ft. and the flow was gauged at 4,120,000 cu.ft. a day.

The Barton well is located about 17 miles west of the Broomfield pool and about 7 miles southeast of Big Rapids. It apparently opens up a new natural gas pool. The estimated flow compares with Mitchell-Keeler No. 1, 8,330,000 cu.ft.; Bartlett-McClintic No. 1, 6,500,000; Hanner's Keeler-Mitchell No. 1, 5,500,000; Wille No. 1, 7,900,000; Skerritt No. 1, 6,800,000; Edmore State Bank, 4,152,000, all in the Broomfield pool, and Bicknell No. 2, 9,050,000, and Pere Marquette No. 1, 10,125,000, in the Clare area, and Scott No. 1, 4,400,000, in the Vernon area.

The Barton well is said to be producing from a similar formation to that of the other wells in Central Michigan, the so-called Michigan Series sand, which comes just above the Marshall formation. The Michigan Series sand is often referred to as a "stray" sand.

The well is in virgin wildcat territory. A dry hole was drilled six miles north, another nine miles south, and a third six and one-half miles east.

On March 3, 1933, gas was struck in the Old Dutch Oil and Gas Company's McGuire No. 1, in Section 35, Vernon township, the gauged open flow being 1,400,000 cu.ft. per day. This is an offset well in proved territory.

During the week ending March 18, a show of gas was made in Crook No. 1, in the northwest quarter of Section 10, Elba township, Gratiot County. Water came in which it was hoped to shut off.

Kerr No. 1, in Section 2, Elba township, was abandoned on February 2 as a dry hole. Covell No. 1, in Section 15, Seville township, Gratiot County, was plugged in February, being dry in the Marshall sands.

Littlefield Ranch No. 1, in Section 9, Surrey township, Clare County, was abandoned late in February at 4,156 ft. after making a show of 30,000 cu.ft. of gas in the Dundee formation. Littlefield Ranch No. 1 well is located about four and one-half miles west of the McKay-Mercier gas field in Grant township, Clare County.

Move To Serve Farms with Natural Gas

The Gas Fuel Service Company, of Los Angeles, has applied to the California Railroad Commission for a certificate to serve farming communities in King and Fresno Counties with natural gas. From the application it is understood that the company plans to bring natural gas to a considerable area where only electricity is now available for farm pumping and irrigation power purposes. Gas would be obtained from the Kettleman-Lakeview Oil and Gas Company which is reported to have developed a well of twenty million cubic feet daily capacity, and the contemplated program may involve laying some 400 miles of pipe line in smaller sizes.

Bronze Welding Rod Booklet

Oxweld No. 25 M. Bronze Patented Welding Rod. 20 pages, 3½ x 6. Published by The Linde Air Products Company, New York.

In this booklet are described the physical and welding characteristics of this new bronze welding rod, with which it is possible to obtain tensile strengths in joining steel of between 56,000 and 60,000 lb. per sq.in. and ductility in excess of thirty per cent. Marked decrease in fuming and excellent weldability are other outstanding characteristics. Many important applications are described in joining metals and building-up wearing surfaces. Of special note are recommendations on a new technique for bronze-welding and for the fusion welding of brasses and bronzes; in particular, the proper flame adjustments are described for the various base metals.

TECHNICAL SECTION

J. A. PERRY, Chairman — H. W. HARTMAN, Secretary — O. S. HAGERMAN, Vice-Chairman

Production Conference To Open in New York May 22

A JOINT Committee Conference of the Production and Chemical Committees will be held at the New Yorker Hotel, New York, N. Y., May 22-23.

The following tentative program has been developed through a committee composed of J. D. Postles, Philadelphia, Pa.; E. J. Murphy, Brooklyn, N. Y.; F. D. Lohr, Kearny, N. J.; and A. R. Belyea, New York City:

MONDAY

*May 22—10:00 A.M.**

Opening Remarks—E. J. Murphy, Chairman, Chemical Committee, Brooklyn, N. Y.

Greetings—Alexander Forward, Managing Director, American Gas Association.

Paper: Purification with Unfluffed Oxide—J. H. Wolfe, Consolidated Gas Electric Light & Power Co., Baltimore, Md.

Paper: Developments in Liquid Purification—Fred Denig, Koppers Construction Co., Pittsburgh, Pa.

Open Forum.

2:00 P.M.

Opening Remarks—P. E. Eddy, Chairman, Gas Production Committee, Chicago, Ill.

Report: Water Gas Committee—L. J. Eck, Minneapolis Gas Light Co., Minneapolis, Minn.

Paper: Notes on Dehydration of Heavy Oil Tar—R. M. Kellogg, Consolidated Gas Co. of New York, New York, N. Y.

Paper: A Study Directed Toward a Solution of the Breeze Problem in a By-Product Coke Oven Plant—R. E. Kruger, Rochester Gas & Electric Corp., Rochester, N. Y.

Paper: Underfiring a Coke Oven with Liquefied Petroleum Gas at Waukegan—E. D. Maurer, Wm. A. Baehr Organization, Chicago, Ill.

Paper: The Use of Mixed Producer and Natural Gas for Underfiring at the Plant of the Chicago By-Product Coke Co.—Chas. R. Locke, Chicago By-Product Coke Co., Chicago, Ill.

Paper: Reduction of Gas Works Steam Load by the Modernization of Transmission Pumping Equipment—J. B. Boniface, Public Service Electric & Gas Co., Newark, N. J.

TUESDAY

May 23—9:30 A.M.

Report: Committee on New Developments—M. C. K. Jones, Chairman, Baltimore, Md.

Paper: Acceleration of the Reaction between Steam and Oil Carbon Deposited on a Refractory Surface Impregnated with Soda—Martin A. Elliott, Baltimore, Md.

Report: Committee on Analyses and Tests—J. F. Anthes, Chairman, Brooklyn Union Gas Co., Brooklyn, N. Y.

Paper: Determination of the Effect of Flue Gas Condensate on Metals and Alloys Used for Flue Pipes on Gas Fired Furnaces—F. P. Mueller, The Peoples Gas Light & Coke Co., Chicago, Ill.

Symposium: Analyses and Tests.

Paper: The Determination of Water Vapor in Gas—Geo. E. Ludwig, Grand Rapids Gas Light Co., Grand Rapids, Mich.

Paper: Notes on Sampling and Analysis of Coke—J. G. Sweeney, Brooklyn Union Gas Co., Brooklyn, N. Y.

Paper: Review of Methods for the Determination of Dust in Gas—L. Shnidman, Rochester Gas & Electric Co., Rochester, N. Y.

Paper: Laboratory Cracking Furnace for Heavy Oils and Gas Oils—I. B. Dick, Consolidated Gas Company of New York, New York, N. Y.

2:00 P.M.

Symposium on the Gum Problem

Presentation—P. T. Dashiell, Philadelphia Gas Works Co., Philadelphia, Pa.

Presentation—E. C. Uhlig, Brooklyn Union Gas Co., Brooklyn, N. Y.

Paper: Purging Works Apparatus—H. W. Alrich, Consolidated Gas Co. of New York, New York, N. Y.

Paper: The Accurate Determination of Heating Values of Gaseous Fuels—E. X. Schmidt, Cutler-Hammer, Inc., Milwaukee, Wis.

Paper: Gas Mixing at Syracuse—H. K. Seeley, Syracuse Lighting Co., Syracuse, N. Y.

Realizing that the Production and Chemical Engineers have not had an opportunity to discuss their problems and Association activities since 1931, the Board permitted the Chairman of the Technical Section—J. A. Perry—to issue an invitation to gas company executives to send delegates to the Joint Committee Conference.

Local utilities are planning to make facilities available to delegates to visit plants, shops and other points of interest in and near New York.

* All times in this program refer to Daylight Saving Time.

Distribution Engineers Meet in Pittsburgh

THE attendance at the Tenth Annual Distribution Conference, held at the William Penn Hotel, Pittsburgh, Pa., April 3-4, again demonstrated the industry's faith in the practical value of these meetings.

Three hundred and twenty-five engineers attended, including two delegates from Canada, three from New Orleans and representatives from as far west as Los Angeles, Calif., and Cedar Rapids, Iowa.

An analysis of the attendance figures shows that sixty-four per cent were operating engineers and thirty-six per cent were representatives of companies manufacturing equipment for distribution work. A most encouraging feature was the greatly increased attendance and interest shown by the natural gas engineers. Of the operating men present fully thirty-five per cent were natural gas men.

C. A. Harrison, in opening the Conference, referred to the fact that ten years ago the first Distribution Conference was held in Toronto, Canada, and paid a tribute to J. D. von Maur whose many friends rejoiced in his recovery from a recent illness.

Major Alexander Forward, managing director of the American Gas Association congratulated the delegates on their splendid record of achievement which he stated had justified continuance of the Conference even throughout the depression period.

The first session was devoted to a symposium on Pipe Corrosion in which the report of the committee, and Dr. Ewing, on the latest samples removed from the ground was particularly well received.

The "Welcome to Pittsburgh" by Frank R. Phillips, President of the Philadelphia Company, not only made all the visitors feel at home, but furnished them with an excellent picture of the achievements of Pittsburgh both as an industrial and artistic center.

The Report of the Unaccounted-for Gas Committee included the distribution of three papers on the subject of: Testing of Large Capacity Meters, J. M. Pickford, Hammond, Ind.; Improving the Records of Large Volume Meters, Hugh E. Ferguson, Chicago, Ill., and Introduction of the Soundograph System for Gas

Distribution conference in session at Pittsburgh

Leak Detection, O. L. Smith, Houston, Texas.

A paper by Dr. J. B. Garner described the excellent results obtained by a continuous leakage survey conducted by the local utilities in cooperation with Mellon Institute of Pittsburgh.

The Progress Report of the Subcommittee on Meters, C. H. Stevick, chairman, particularly stressed recommendations regarding tolerance allowance in adjustment of outgoing meters and method of computing meter error.

Erick Larson, of the Long Island Lighting Company, presented a report evaluating the progress made in pipe joint research, and the proposed weld test meter at the A. G. A. Laboratory.

An exhibit of the Weld Test Meter developed at the Laboratory as well as the meter developed by the Ferrous Magnetic Company were examined with interest by the delegates.

K. R. Knapp presented a report from the Laboratory on the Mechanical Pipe Joint Research conducted on behalf of the American Cast Iron Pipe Research Association.

J. A. Perry described the results of similar tests conducted at the Laboratory of the United Gas Improvement Company.

In the absence of T. H. Kerr, of the Columbia Engineering and Management Corporation, N. S. Brown presented his paper "Distribution of Gas through the Medium of High Pressure Plant."

During the Conference, meetings of the following Committees were held:

Managing Committee, Pipe Coatings Corrosion Committee, Pipe Joints Committee, Distribution Committee, Program Committee.

H. W. Battin, of the United Gas Improvement Company, was appointed chairman of the Program Committee of the 1934 Distribution Conference.

Circulars descriptive of the Beal Medal Award were distributed at the Conference, and delegates were urged to submit papers to compete for the award to the Program Committee of the Technical Section, and to A. E. Higgins, secretary of the Natural Gas Department.

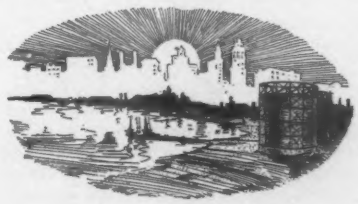
Mr. von Maur invited the Distribution Conference to again meet in Toronto next year, stating it was the desire of the Consumers Gas Company, the City of Toronto, the Dominion of Canada, the British Empire and the whole von Maur family.

Butane Plant's First Year Shows Good Results

NINETEEN HUNDRED THIRTY-TWO marked the first full year's operation of New York Power and Light Corporation's butane gas plant at Canajoharie which supplies that village and Palatine Bridge. These two villages had no gas supply previous to the installation of the butane plant which first operated late in 1931. The figures on the year's send-out of the plant show some interesting results.

Increasing from 605,300 cu.ft. in January, 1932, to more than 1,000,000 cu.ft in December, the send-out reached a new peak in January, this year, of 1,168,900 ft. The average monthly send-out last year was 763,250 cu.ft., the total for the year being 9,159,000. Weekly figures show an increase from 153,045 cu.ft. during the first full week's operation of the plant in August, 1931, to a maximum week, ended January 30, 1933, of 275,286 ft. This is compared to the 1932 weekly average of 175,168 cu.ft.

Another interesting fact about the Canajoharie gas system is that nearly thirty-seven per cent of the 354 customers have automatic water heaters installed, exceeding the nearest New York Power and Light district by nearly three-to-one, on a percentage basis of water heaters to total customers.



Opens Baltimore Office

MINOR C. K. JONES, formerly chief chemist of the Consolidated Gas Electric Light and Power Company of Baltimore has established a consulting chemical engineering organization in Baltimore, Md. Mr. Jones has done graduate work in gas engineering at Johns Hopkins University and in Chemistry at the University of Maryland. He has been active in American Gas Association work for years as a member of the Chemical Committee and the Advisory Committee on Warning Agents. At present he is vice-chairman of the Chemical Committee.

German Gas Company Increases Sales Despite Depression

RECORD gas sales were reported during 1932 by Rhurgas A. G., of Essen, Germany, according to a report to the United States Commerce Department from Trade Commissioner William T. Daugherty, Berlin.

Sales in 1932 amounted to 843,300,000 cubic meters compared with 796,000,000 in 1931, and 718,300,000 in 1930.

Communal gas works throughout the Ruhr also showed improvement, but no figures are available at the present time. Increased consumption is reported particularly from South Westphalia, Hagen and Hanover. Increased consumption by Ruhr industrial customers in the last quarter of 1932 contributed to the minor "boom" noted during that period.

Increased consumption this year has persuaded the company to revive construction that was stopped by the depression. Work will start, for example, on a hook-up of the Koenig Ludwig coke plant with the main line, and on perfection of a connection between the Gneisenau pits of the Harpener Bergbau A. G. with the Hanover line traversing Hamm.

Report on Portable Equipment in Distribution Work

By F. M. Goodwin*

Boston Consolidated Gas Co.

EFFORTS have been made to gather together information from all parts of the country relative to portable equipment and accessories. The information which is reported herein primarily concerns new equipment developed in the past year or two, improvements in older equipment, and new uses to which old or new equipment have been put to.

The small amount of construction work carried on has not been conducive to the development of new equipment. It is interesting, however, that even under such conditions, there have been some notable advancements.

Power Tapping Machines

Three companies submitted information on power tapping machines. One of the companies was using a tapping machine designed for power operation while the other two companies were using modifications of the hand tapping machines. In the latter two cases the companies had redesigned the machine to permit the use of an air motor. In commenting on this application the engineer of one company states that, "These alterations should include an increase in the overall height of the tapping machine to accommodate the air motor, an increase in the area of the saddle in order to reduce the vibration of the combination, and the use of a double strap saddle. It was found that the single strap or the single chain which fastens the tapping machine on to the pipe would not hold the machine securely on to the pipe at the more rapid cutting and tapping speeds that can be obtained with the air driven motor."

Literature has been received on three machines. The first is a power tapping machine with a capacity from one-half inch to four inch taps inclusive. The second is an adaptation of the first but is equipped with an auxiliary slide valve attachment and an auxiliary bonnet to permit the insertion of a plug in the tapped hole without loss of gas. The third machine has a capacity up to and including six inch taps. No actual operating experience was reported on these machines.

Portable Cutting Machines

PORTABLE PIPE SAW—A recent development in portable pipe cutting apparatus is known as the "Portable Pipe Saw." This is a German invention recently introduced in this country. To our knowledge, this machine has been tried by but one company. The report from this company on the machine is very complete and is as follows:

"Cutting speed—On circumferential foot in five minutes.
By actual test—30" pipe in 45 minutes.
Adapted to pipe sizes from 12" to 60" in diameter.
Requires about 90 lb./sq.in. air pressure and 80 cu.ft. of free air/minute.
Speed—Air motor.....3,000 R.P.M.
Cutter wheel.....100 R.P.M.
Feed wheels.....¼ R.P.M.

"The cutter wheel, which is similar to a milling cutter, can be set for any depth, thus permitting when desirable, an initial cut before complete penetration. This of course gives greater safety and also makes possible the usual quick knock out connection. The machine is carried around the pipe on four wheels, two feed wheels in front, and two followers in back. The feed wheels have sharp teeth for traction purposes, and the rear wheels have slightly different diameters in order to offset the drag of the cutter wheels which is on the side. This latter feature keeps the machine in almost perfect alignment.

"The saw we purchased had made about one hundred cuts for demonstration purposes before being delivered to us, and has since been used for about twenty cuts on our lines. While we have experienced some difficulty due to stalling of the motor on large sizes of heavily scaled and dirty pipe, we nevertheless consider the investment in this machine well justified."

Distribution engineers are using more and more machines for cutting pipe in order that the cut will be straight and clean. The uncertainty of making cuts by hand, especially where time is an important factor, has interested distribution engineers in cutting machines. Since this pipe saw is adaptable for all sizes of pipe from eight inches to forty-eight inches in diameter, it should be thoroughly examined.

PIPE CUTTING AND BEVELING MACHINE FOR WROUGHT IRON, STEEL, AND GALVANIZED PIPE—A machine has recently been developed by a leading manufacturer in this country for cutting wrought iron, steel, and galvanized pipe ranging in diameter from four inches to thirty inches. At the same time it cuts, it also bevels the pipe at the desired angle for welding. No reports from operating companies have been received on this machine to date.

Portable Lighting Units

The majority of companies are now using portable lights energized from storage batteries for night work. Several of the larger companies also utilize small engine driven generators which may be moved about by two men. These are primarily used for larger construction jobs which must be carried on at night rather than the small maintenance jobs for which the battery unit is adequate. There are several manufacturers producing both types of equipment.

Street Trailers

The information received from distribution engineers, especially in the larger companies, indicates a preference for all metal portable trailers. Several manufacturers are now making a variety of units which make it possible for the distribution engineer to pick a type suitable for his requirements as to inside arrangement, overall size of the trailer, accessories attachments, and the trailing speed desired. The prices on these units are now comparable to the equivalent trailer which can be made in the companies own shops.

Portable Compressors

The use of portable compressors has grown from year to year and many standard makes are on the market, the operation and operating cost of which are very similar. Where these compressors are to be used on many small and scattered jobs, it is necessary to mount them on a truck chassis. The weight of a skid mounted one hundred ten or one hundred twenty foot compressor has been such as to require a one and one-half ton chassis. The truck unit was devoted entirely to transporting the compressor. The duty on the motor of the truck unit was very small as the mileage involved was naturally low.

It has been felt for some time that a compressor requiring but little space on the truck chassis, and driven from the truck engine, would be very valuable inasmuch as it would permit the carrying of equipment and men in addition to the compressor. Furthermore, if a compressor were not required, the truck unit would still be available.

Preliminary tests on a light air cooled compressor, having a piston displacement of one hundred forty-two cubic feet per minute at seven hundred twenty-five R.P.M., indicated that this unit would be suitable for use in a combination truck and compressor unit. The company interested in this development had available a truck chassis with a motor of adequate size to drive the compressor in question. The manufacturer of this truck also had a power dome through which it was possible to drive the compressor. Although this type of drive was not the type desired, nevertheless, it was suitable for a trial as to the feasibility of a combination truck and compressor.

Channel members back of the cab support the compressor on the left hand side of the truck and the air receiver on the

* Member of Distribution Committee appointed as sponsor for Portable Equipment in Distribution work.

right hand side of the truck. The actual space taken up by the compressor and tank is approximately eight square feet. The body of the truck was designed with special boxes for fittings and equipment and a place was provided for carrying service pipe. The idea was to utilize this truck during the day for the movement of service gangs and as an emergency truck at night. The unit has been in operation approximately six months. It replaced a platform truck and a compressor. Since this was applicable for three shifts, it meant equivalent reduction in units and personnel. No difficulty has been experienced with the compressor unit and to date it has not been opened. The power take-off has given a small amount of trouble but nothing serious has developed.

The manufacturer of the compressor has now developed a split propellor shaft power take-off and has equipped a truck with this type of take-off together with a compressor and tank. This unit is now being tested.

Another manufacturer has developed a two stage air cooled unit for similar operation but has not as yet developed the power take-off or the motor controls.

The compactness and light weight possible in the combination truck and compressor, together with the fact that the truck may be utilized for purposes other than carrying the compressor, have caused considerable interest by distribution men.

Boring Machines

There is nothing radically new to report on the line of boring machines. With the machines which have been developed, it is essential that soil conditions be right to permit general usage. It would seem all distribution men are very much interested in machines for boring but feel that there is room for a great deal of improvement.

Portable Blowers

Complete lines of portable blowers driven by small gasoline motors are now available. These blowers are being used by many of the companies who have governors in pits on their systems. These machines are very convenient to handle, are light in weight, and take up but little space in a truck. They permit the clearing of manholes and governor pits with rapidity and insure a fresh supply of air to men working in these confined spaces.

Gasoline Driven Hammer

One company reports the use of a gasoline hammer as follows: "We have been using gasoline hammers on one repair crew for about five months; cost of maintenance has been quite low; have been able to dispense with portable one hundred sixty foot air compressor; eliminates having two trucks (repair and compressor) in congested down-town area; eliminates taking compressor back and forth on jobs when there is no work for the compressor. The gasoline hammer will cut practically as much paving in the same time as will an air gun, except in real hard concrete."

Other distribution engineers have shown interest in this tool and it would seem that the tool should have trials under varying operating conditions.

Detachable Bits for Star Drills

Several companies reported favorably on the use of detachable bits for rock and pavement drilling purposes. These companies felt that the cost per drill unit was lower than with the older type of drill and further that it is possible to drill more footage per drill unit. One company stated that some difficulty had been encountered with the detachable bit and had given up their use. Further investigation should make definite the advantages or disadvantages of this appliance.

Insertion Gates

The development of special apparatus has made it possible to place gates in a line without shutting down the line. This work has been successfully carried out, by a number of operating companies with the cooperation of the manufacturer, on both steel and cast iron mains of practically all sizes. This method has proven to be most valuable especially where a shutdown would cause a serious interruption to service or the possibility of a low pressure area.

Stoppers

A new type of main stopper has been developed and is being used by one large operating company. The advantages claimed for this stopper are that considerable less skill and experience are necessary by the workmen, that the diaphragm is always at right angles to the axis of the pipe, that the stopper moves along the top of the main instead of the bottom and does not scrape up foreign matter which may be found at the bottom of the pipe, that it has forced contact at four places instead of two, and that it can be used in mains carrying higher pressures than the stoppers previously made.

Another type of stopper of the bag type has also been developed. It is claimed that these units are much more effective than the older type. In connection with this, a reamer is provided to take off the burrs from the inside of the pipe after drilling has been completed. The operations are all done through a stuffing box and there is no loss of gas. The stopper, itself, is inserted into the main in a tubing which passes through a stuffing box. After being inserted into the main, it is then inflated. Upon removing the stopper, it is possible to insert a plug through a valve into a threaded coupling again without loss of gas and then remove the valve. It is claimed that these stoppers may be used successfully at twenty-five pounds gas pressure although it is stated that they are not safe to weld against. Some difficulty may be encountered if there is too much rust in the main.

In connection with stoppers, we want to mention that special fittings have been developed to permit making extensions without shutting down and for the removal of stop cocks against pressure. These developments are all in line with the present day distribution practice of operating at higher pressures.

Gas Detectors

There have been many gas detectors placed on the market but until recently none permitted the simultaneous testing for:

1. Toxic gases.
2. Combustible content (whether combustibles are below the lower limit of flammability, within explosive range, or above the upper limit of flammability).
3. Deficiency of oxygen.
4. And in addition were extremely portable.

More and more interest is being shown by distribution engineers in the testing of the atmosphere in manholes and governor pits to determine possible sources of leakage of gas. Several types of gas detectors are being used throughout the country with extremely satisfactory results.

The detector, which was recently placed on the market, is compact, is light in weight, is sturdy, is simple to operate, and is designed to permit testing for either one or all of the items given above. Although this detector has been on the market for a short time, it is now in use in several companies and these companies have reported the operation of the detector as being highly favorable.

The Gum Problem in the Distribution System*

By J. A. Perry

The United Gas Improvement Company

THE gum problem requires serious consideration and a satisfactory solution must start at the source of trouble, the manufacturing plant, and terminate at the consumer's appliance. I shall not attempt in this short paper to go into great technical details. Probably the best and most informative paper on the cause and formation of gums in manufactured gas was that presented to our Association last October by W. H. Fulweiler.

Our technicians now recognize two distinct types of gum. The first type is formed only in the liquid phase and is ordinarily encountered only in carburetted water gas or mixed gas. It is formed by the polymerization and oxidation of condensed

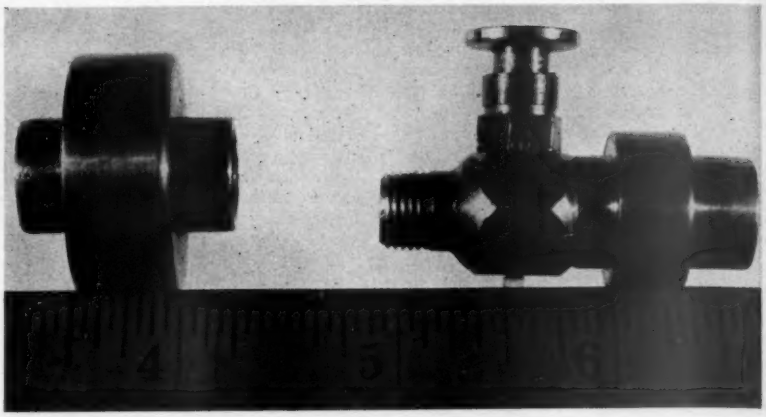
* Paper presented before Tenth Annual Distribution Conference, Hotel William Penn, Pittsburgh, Pa., April 3-4, 1933.

hydrocarbons and its formation is greatly accelerated by the presence of sulphur compounds which act as catalysts. This type of gum appears as deposits in compressors and certain types of works' meters, on the air side of governor diaphragms, on the diaphragms, valves and valve seats of consumers' meters and in services and house piping, etc.

Since liquid phase gums will not form until after the hydrocarbons have first condensed from the gas, evidently we can prevent their formation if the gas leaving the plant has a hydrocarbon dew point low enough to prevent the condensation of any light oils in the distribution system. This low hydrocarbon dew point may be obtained either by cooling, using some form of refrigeration system, compression, or a combination of cooling and compression, or the hydrocarbons themselves may be removed to a point where they are not deposited out as drip by oil scrubbing. The difficulties resulting from liquid phase gums can be greatly mitigated by using adequate scrubbing and condensing facilities in the plant and by keeping the oxygen content of the gas at the lowest practical point.

The vapor phase gum is commonly found in coal gas, but has also been found in carburetted water gas, and it is now an acknowledged fact that it is caused by the reaction of oxides of nitrogen with the hydrocarbons and the oxygen in the gas. The U. G. I. Laboratories have found that there are more than twenty-seven hydrocarbon compounds that react with oxides of nitrogen to form gum. This gum not only deposits in compressors, meters, etc. as does the vapor phase gum, but since it exists in the gas as a smoke of solid or semi-solid sticky particles it deposits at points where the temperature would prohibit the formation of vapor condensate. The amount of gum deposited is small but a surprisingly small amount of gum will give trouble in automatic controls, pilot valves, etc.

The cure for the vapor phase gum trouble is to reduce the oxides of nitrogen as much as possible and preferably completely remove them at the plant, and there is the rub. One must have fully developed some test that is reliable for the determination of the minute quantities of these substances in the gas. Over a two year period the U. G. I. Laboratories have developed a test which is relative and will give the same results when conditions are the same even though it may not indicate the exact amount of oxides of nitrogen in the gas. Armed with this test we were able to establish the relative amounts of oxides of nitrogen in the gas at various parts of the scrubbing, condensing and purification systems. By careful follow-up we found that the oxide purifiers for removing hydrogen sulphide would also largely remove the oxides of nitrogen. Also that seemingly without rhyme or reason the purification oxide when activated and put into use will give off the oxides of nitrogen to the gas. Without going into further details, I will state that through proper arrangement and use of oxide purifiers we have found it possible to stabilize conditions so that the total oxides of nitrogen leaving the purifiers will run from 4 to 10 grams per million by our tests and such plants can be operated on the average to say 6.5 grams per million or say 1/10 grain per 1,000 cu.ft. We are now engaged in testing out materials and methods which promise to reduce these traces of oxides of nitrogen to an average of one third of this or say to 1/30 of a grain per M cu.ft.



New pilot controls

The needle valve type of pilot, particularly the small flow 2/10 to 3/10 cu.ft. per hour is easily and quickly stopped by the vapor phase gums. A gas containing 1/10 of a grain of the oxides of nitrogen per 1,000 cu.ft. when aged for 18 to 24 hours will stop an ordinary Rutz lighter pilot in from 10 to 15 days. With greater quantities of oxides of nitrogen and less time to age the pilots will stop up sometimes even as quickly as in 6 to 8 hours.

It is a fortunate thing for the distribution or service man that many things are operating in his favor. The surfaces of the holders, mains, services, accumulated deposits, etc., are all acting to absorb the oxides of nitrogen and to cause some of the gum particles that have formed to drop out. The meter and house piping come into play similarly. Conversely if the gas has been running high in oxides of nitrogen and these facilities have absorbed them and the gas should run low in oxides of nitrogen these absorbing surfaces will give off the oxides of nitrogen to the gas. Possibly this can be illustrated by some tests we have made in the laboratory with meters and house piping. We have taken both a dipping and non-dipping meter from service and found that by maintaining a temperature of 100° to 140° F. and passing gas through them at the rate of 6/10 ft. per hour, supplying three pilots, that the pilots would stop in from 60 to 150 hours, whereas the same kind of a gas going through the new unused meters did not stop pilots with gum. Conversely we have doctored gas with nitrogen peroxide (NO_2) and have found that pilots on the outlet of a meter and service piping assembly lasted longer than those on the inlet. Where only the amount of gas consumed by the pilot was flowing through the meter and piping the pilot on the outlet lasted thirteen times as long as on the inlet to the assembly. When we consider the fact that the meter may be supplying only the pilot from 80% to 90% of the time we can see the reason why we do not have a great many more pilot outages than the relative small number that now give us so much concern.

Having reached the conclusion that oxide purifiers and even liquid purification plants with oxide catch boxes can be operated or stabilized to largely remove the oxides of nitrogen from gas, and thus largely reduce the complaints of pilot outages, we knew from experience that there would still be occasional serious stoppages such as on automatic and time operated ovens. We concluded that a satisfactory substitute for the needle valves for controlling small flows of gas for pilots must be found and we promptly set about to secure a solution of the problem. I am glad to say we have found the solutions. They have been worked out, in suitable forms for use on both new or old appliances. As an illustration of our success we have severely doctored the gas and made comparative tests using ordinary Rutz lighters and our improved pilots. The ordinary lighter goes out in from 10 to 48 hours, whereas after 25 days' operation the substitute lighters show no diminution in size of flame. Allowing for service conditions, the beneficiating effects of the meter and house piping, etc., one of our laboratory assistants has estimated that these new types of pilot lights should last at least 13 years without a stoppage.

Several variations in pilot controls using the same principle were tried out and two types developed which gave practically undiminished flow when using gas heavily inoculated with NO_2. We have fully developed one of these two types of controls, so that the same parts can be used on either the Rutz push button type lighters or on the automatic ignition types of lighters.

The two pilot controls illustrated are not adjustable and were designed for 4" of burner bar pressure and .2 cu.ft. per hour

for the push button type and .4 cu.ft. per hour for the automatic ignition type.

In order to take care of all conditions, designs have been worked out with sufficient parts so that adjustment can be made at the time of installation for any particular condition to give a flow of .2 to .5 cu.ft. per hour as may be required for the particular pilot or the particular pressure condition even if the pressure should be as low as 2½" at the burner bar or as high as 10" at the burner bar.

These adjustable types of controls will be slightly larger than the non-adjustable types shown in the cut.

One thousand of the non-adjustable types of pilots have been ordered for trial by the Philadelphia Gas Works Company. They will be made available to a few other companies that desire some for trial and as soon as it appears that the gas industry will use them on a large scale, arrangements will be made to produce and furnish them at reasonable prices to the industry and to the appliance manufacturers.

Summing Up

Gum formation in the distribution system of a manufactured or mixed gas situation can best be reduced by proper and suitable treatment of the gas at the plant. Needle valve stoppages of appliances can best be further reduced by substituting new non-gum stop pilots on old appliances where complaints occur, and by requiring all new appliances to have these new types of pilots.

Energetic Campaign To Make Housewives Conscious of Gas Economy

(Continued from page 180)

In the latter classification may be placed the technical copy. During the final cooking school, our advertisements were more or less technical because of the development of a new, non-clog, rust-proof burner with a small burner head and with such a wide range of flame adjustment that each burner could be used for simmering or hot fast fire as desired without a shift of vessels. The housewife is sufficiently familiar with ranges to know what this means and it is reasonable to believe it contains sufficient news value to interest her.

Usually these cooking schools were held four days, beginning on Tuesdays and ending on Fridays. Each session was crowded and long before time for doors to open women stood in line waiting for choice seats.

At one school a night session was held, which was called a "White Elephant" session and the wives brought their husbands. The inference is obvious. However, the field house at Washington University, where this school was held, was filled almost to capacity, both main floor and balcony. No doubt, for the first time many husbands were made to understand and appreciate such terms as oven heat control, insulated ovens, non-clog burners, automatic lighters. Heretofore, his only contact with the gas range or the commodity which supplied heat for his meals was when he paid the bills. We prepared small news bulletins on the history of gas and statistics showing how a meal for six persons could be cooked for approximately 3 cents, according to government tests.

But the entire responsibility of meeting competition, and competition is here a greater force than ever before, should not be placed on local companies. There should be a united effort with exhaustive studies of the situation. Smug self-satisfaction with our tradition should be kicked out the back door. It isn't that the gas industry hasn't kept stride with the march of progress, rather it's that we haven't been spectacular in telling about it. Often a good story wants for the telling, but it is going to require showmanship these days to put it across.

Gas Mixing

(Continued from page 190)

States. Manifestly, gas of any kind, however, cannot be distributed profitably in the newer sections of our nation at as low a rate as it can in the more densely populated areas. Numerous and recent studies along certain lines, on the other hand, have convincingly demonstrated the economic advantages of city gas over other forms of energy. Consequently, it is our belief that the position of gas for industrial and domestic use not only here, but elsewhere, will be strengthened as time goes on, and with the increasing interest throughout our business in the subject of gas mixing, we feel confident that the expenditures of time and money contracted by the American Gas Association as a result of its mixed gas research will prove particularly valuable to people of the gas industry of the Middle West.

In conclusion, it is believed that our Association's Mixed Gas Research Committee has made a particularly valuable contribution to scientific literature through the medium of its various summary reports. Moreover, it seems that a thorough knowledge of the principles governing this important subject is absolutely essential if our engineers are to properly plan new gas mixing processes, or change existing ones. Still further, it is felt that this knowledge will become more necessary to our business as time goes on. New problems may arise, which will require somewhat different treatment than employed at present times, but the basic information has been supplied and it will afford a foundation upon which our industry may build with confidence through the years to come.

Boiler Feed Pumps

The P. M. Lattner Manufacturing Company, Cedar Rapids, Iowa, has brought out an entirely new line of automatic electric boiler feed pumps and condensation return systems, particularly designed for industrial gas boilers operating at steam pressures up to 300 pounds per square inch.

Separate bulletins are issued for small pumping units suitable for steam boilers up to fifteen H.P. capacity.

The larger Lattner systems make use of the Worthington duplex horizontal plunger pump with silent chain drive. When requesting specific information regarding condensation return systems, the manufacturer always requires knowledge of the following: Size and type of boiler, horse power rating, actual steam operating pressure, not the maximum rating, electric specifications of power or lighting circuit.

Gas Range Sales 10 Times Above Electric

During 1932, the year of the widely heralded electric range Sales Campaign, the sales of gas ranges in the United States continued to be approximately ten times the sales of electric ranges.

"Electrical Merchandising" says that sales of electric ranges in 1932 were 27 per cent of the year's quota.

The decline in gas range sales in 1932 below 1931 was approximately 37 per cent, as against 49 per cent decline in the sales of electric ranges in the corresponding period.

Monthly Summary of Gas Company Statistics

FOR MONTH OF FEBRUARY, 1933

Issued April, 1933, by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

COMPARATIVE DATA ON THE MANUFACTURED AND NATURAL GAS INDUSTRY FOR THE MONTH OF FEBRUARY

	Month of February			Two Months Ending February		
	1933	1932	Per cent Change	1933	1932	Per cent Change
Customers						
Domestic (Including House Heating)	14,401,300	14,993,600	— 4.0			
Industrial and Commercial	980,600	995,100	— 1.5	*See February*		
Total	15,381,900	15,988,700	— 3.8			
Revenue (Dollars)						
Domestic (Including House Heating)	49,146,600	52,452,300	— 6.3	101,817,800	107,645,000	— 5.4
Industrial and Commercial	17,660,900	19,100,000	— 7.5	34,987,300	38,001,400	— 7.9
Total	66,807,500	71,552,300	— 6.6	136,805,100	145,646,400	— 6.1

COMPARATIVE DATA ON THE MANUFACTURED GAS INDUSTRY FOR THE MONTH OF FEBRUARY

Customers						
Domestic	9,327,800	9,801,400	— 4.8			
House Heating	62,400	59,400	+ 5.0			
Industrial and Commercial	480,600	495,400	— 3.0	*See February*		
Miscellaneous	8,300	7,400	—			
Total	9,879,100	10,363,600	— 4.7			
Gas Sales (MCF)						
Domestic	20,713,500	22,152,500	— 6.5	42,650,700	45,851,000	— 7.0
House Heating	3,395,400	3,310,900	+ 2.6	6,819,600	6,546,200	+ 4.2
Industrial and Commercial	6,660,800	7,550,100	—11.8	13,438,500	15,140,800	—11.2
Miscellaneous	179,600	187,500	—	364,400	390,000	—
Total	30,949,300	33,201,000	— 6.8	63,273,200	67,928,000	— 6.9
Revenue (Dollars)						
Domestic	24,607,600	26,572,600	— 7.4	50,536,600	54,905,700	— 8.0
House Heating	2,288,700	2,444,300	— 6.4	4,581,000	4,847,100	— 5.5
Industrial and Commercial	5,841,100	6,720,300	—13.1	11,786,300	13,447,900	—12.4
Miscellaneous	134,400	126,300	—	256,300	255,600	—
Total	32,871,800	35,863,500	— 8.3	67,160,200	73,456,300	— 8.6

COMPARATIVE DATA ON THE NATURAL GAS INDUSTRY FOR THE MONTH OF FEBRUARY

Customers						
Domestic (Including House Heating)	5,011,100	5,132,800	— 2.4			
Commercial	471,600	469,600	+ 0.4			
Industrial	14,300	15,900	—10.1			
Main Line Industrial	4,600	5,500	—16.4	*See February*		
Miscellaneous	1,200	1,300	—			
Total	5,502,800	5,625,100	— 2.2			
Gas Sales (MCF)						
Domestic (Including House Heating)	34,997,500	36,918,000	— 5.2	75,474,800	76,458,000	— 1.3
Commercial	12,007,900	11,264,300	+ 6.6	22,326,500	21,081,300	+ 5.9
Industrial	27,562,200	27,851,300	— 1.0	54,508,400	57,048,600	— 4.5
Main Line Industrial	10,766,600	9,847,200	+ 9.3	22,278,500	21,470,700	+ 3.8
Miscellaneous	927,500	926,200	—	1,720,700	1,787,900	—
Total	86,261,700	86,807,000	— 0.6	176,308,900	177,846,500	— 0.9
Revenue (Dollars)						
Domestic (Including House Heating)	22,250,300	23,435,400	— 5.1	46,700,200	47,892,200	— 2.5
Commercial	5,077,200	4,978,800	+ 2.0	9,713,600	9,464,500	+ 2.6
Industrial	5,300,200	5,956,900	—11.0	10,517,600	11,965,700	—12.1
Main Line Industrial	1,109,600	1,126,900	— 1.5	2,386,100	2,553,600	— 6.6
Miscellaneous	198,400	190,800	—	327,400	314,100	—
Total	33,935,700	35,688,800	— 4.9	69,644,900	72,190,100	— 3.5

Gas Utility Sales Drop During February

REVENUES of the manufactured and natural gas industry aggregated $66,807,500 for February, 1933, as compared with $71,552,300 for February, 1932, a decline of 6.6 per cent.

The manufactured gas industry reported revenues of $32,871,800 for the month, a drop of 8.3 per cent from a year ago, while revenues of the natural gas industry totalled $33,935,700 or 4.9 per cent less than for February, 1932.

Sales of manufactured gas reported for February totalled 30,949,300,000 cu.ft., a decline of 6.8 per cent, while natural gas sales for the month were 86,261,700,000 cu.ft., a drop of 0.6 per cent.

The decline in sales volume appeared to characterize most sections of the country, although not to the same extent. In New England February sales were 11 per cent under a year ago, while in the Middle Atlantic states the decline was much less, amounting to 5.2 per cent for New Jersey and 4.2 per cent for New York. In Pennsylvania the loss was only 3.8 per cent. The curtailment in manufactured gas sales was more pronounced in the East North Central States, Wisconsin showing a loss of 7 per cent and Illinois of 8 per cent. In Michigan February sales were 11 per cent under a year ago, while revenues were less by nearly 16 per cent, the relatively greater decline of revenues in that state doubtless reflecting in part the banking troubles experienced during the latter part of February.

Sales of natural gas in the mid-continent area showed a gain for the month over a year ago. In Texas the increase amounted to 2 per cent while Oklahoma companies reported a gain of nearly 5 per cent.

Turner Valley Supply

THE Turner Valley (Alberta) Gas Conservation Board recommends that all drilling restrictions be removed in Turner Valley, but at the same time advocates that the total gas allowance be 200,000,000 cu.ft. daily. The Board estimates remaining gas reserves in the field, as of November, 1932, at 512 billion cu.ft., available above 400 pounds a square inch pressure.

Kitchen Planning Service For Mrs. Homemaker

A SERIES of six advertisements featuring ideal kitchens are being run in daily papers throughout the territory of the Public Service Electric & Gas Co. in New Jersey. These advertisements, according to Ada Bessie Swann, home service director, give to the homemaker the information that they may secure assistance from the home economics department of the Public Service Company in planning new kitchens or remodelling old ones.

"If, and when requests for assistance for planning kitchens in new houses or remodelling kitchens in old houses are made in answer to these advertisements or if any other firms refer to us requests resulting from their advertisements on modern kitchens, the home economics department is prepared to furnish complete kitchen planning service in the following manner," explained Miss Swann:

"A member of the home economics department will call upon the prospect in order to tabulate information on a survey blank that will give the exact measurements of the kitchen even though the sketch is in rough form. Actual measurements of wall space, the location and size of existing windows and doors will be shown, the present equipment in the kitchen will be drawn into this sketch, showing the correct size and placement of equipment. A survey form listing seventeen questions will record information gained by the home economics consultant during her survey.

"Following this preliminary survey the home economics consultant returns to her office to draw up a kitchen to scale and compiles data on the appliances which are to be recommended in the completed specifications to the customer. These gas or electric appliances will be designated by type and size only.

"If an adequate supply of hot water is not available at the kitchen sink, recommendations for an automatic water heater will be included in the specifications even though the water heater may not be placed in the kitchen.

"After the finished pencilled drawing has been studied by the lighting department of the company, in order to care for lighting and convenience outlets, there will then be prepared in color a finished drawing of the remodelled kitchen showing the color combinations decided upon by the customer and the home economics consultant.

"The drawing in color, with the complete recommendations for the kitchen and an estimate cost sheet indicating to the customer the approximate cost of a completely remodelled kitchen, will be taken to the customer by a home economics consultant or forwarded to the firm requesting the survey, in which case a representative of the firm for whom the plan was prepared will deliver the plan and drawing.

"Information on different types of kitchen cabinets, plumbing supplies and floor coverings will be included in the specifications. Such suggestions will be based upon information from reliable agencies and a number of suggestions for cabinets, sinks, floor coverings will be submitted so that the customer can deal directly with the cabinet, equipment, wiring, plumbing, painting and floor covering agencies."

The general plan for kitchen arrangements as planned by the department under the direction of Miss Swann includes a study of arrangements for the most efficient results.

In the process of preparing three meals a day in a kitchen, three different work centers must be provided. These centers must be in the correct relation to each other for the most efficient work. The recommendation made is that they be grouped along three walls of the kitchen in the proper position so that the work can be carried on with a continuity of operations that will reduce steps in a kitchen and motions in the performance of the work. Public Service kitchens are, therefore, so planned to include in order the food preparation center, then the cooking center, and finally the serving center.

The food preparation center includes the sink with the refrigerator and the work cabinet nearby. The base for the cooking center is the gas range which should be near the cabinet or work table where foods are being prepared and not too far from the entrance to the dining room. Near the range are found all the utensils to be used in the cooking preparation. The serving center includes a serving table on wheels and a cabinet space for the storage of china, glassware and silver.

Associations Affiliated with A. G. A.

Canadian Gas Association
Pres.—Hugh McNair, Winnipeg Electric Co., Winnipeg, Man.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.

Empire State Gas and Electric Association
Pres.—Alfred H. Schoellkopf, Niagara Hudson Power Corp., Buffalo, N. Y.
Chairman, Gas Section—A. M. Beebee, Rochester Gas & Electric Corp., Rochester, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

Illinois Public Utilities Association
Pres.—Bernard J. Mullaney, The Peoples Gas Light & Coke Company, Chicago, Ill.
Sec.—J. R. Blackhall, Suite 1213, 79 West Monroe St., Chicago, Ill.

Indiana Gas Association
Pres.—R. S. Brunner, Indiana Gas Utilities Co., Richmond, Ind.
Sec.-Tr.—P. A. McLeod, New Castle, Ind.

Michigan Gas Association
Pres.—J. E. Spindle, Grand Rapids Gas Light Co., Grand Rapids, Mich.
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Maryland Utilities Association
Pres.—F. A. Mitchell, Eastern Shore Public Service Co., Salisbury, Md.
Sec.—D. E. Kinnear, 803 Court Square Bldg., Baltimore, Md.

Mid-West Gas Association
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Ohio Gas and Oil Men's Association
Pres.—L. K. Langdon, Union Gas & Electric Co., Cincinnati, Ohio.
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Oklahoma Utilities Association
Pres.—R. J. Benzel, Southwestern Bell Telephone Co., Oklahoma City, Okla.
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Pres.—J. J. Brennan, Memphis Power & Light Co., Memphis, Tenn.
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Exec. Sec.—J. N. Cadby, 135 West Wells St., Milwaukee, Wis.

Personnel Service

SERVICES OFFERED

Manager experienced in manufactured and natural gas and electricity. Has handled exceptional difficult situations in operating, new business and electric competition and natural gas change-overs. **695.**

Sales manager. Eighteen years with one utility company plus sales promotion experience with one of the largest gas appliance manufacturers. Outstanding record in merchandising and sales management, experienced in meeting electric competition. Well qualified in building good will. **698.**

Assistant to utility executive. Four years with leading gas magazine as natural gas editor in southwest and south, news editor and advertising copywriter has acquainted me with all departments of gas business and provided a national viewpoint on current problems. University graduate and special student (31). Single, willing to go any place. **699.**

Sales executive. Over 25 years' experience in sales contacts with utilities for large gas appliance manufacturer. Familiar with sales promotion and distribution. A competent director of personnel. Seeks connection with growing concern. **704.**

A young, but thoroughly seasoned, public utility **executive** well qualified to build industrial, house heating, or commercial **sales** under existing business conditions is immediately available. Thoroughly familiar with gas industry's problems. Has many workable schemes for load building. Desires position immediately with aggressive utility or appliance manufacturer. **705.**

Eleven years as **salesman,** estimating heating requirements for architects, plumbers, steamfitters, gas companies and retail trade. Also helping gas company sales force in promoting sales of gasteam radiators and gas furnaces. **706.**

Natural gas **engineer** (36). Ten years' experience with operating company and management corporation. Specially fitted to handle all engineering problems of a natural gas company from production to distribution. Thoroughly familiar with production engineering, design and valuation. Available on short notice. **708.**

Research engineer, European technical education; four years' experience with leading American manufacturer of gas appliances. Familiar with design, testing, development of water heaters, boilers, furnaces, conversion burners and radiators. Has handled gas utilization laboratory and supervised appliance installations. Desires position in connection with development or sales promotion of gas appliances. **709.**

House heating graduate **engineer:** ten years' practical experience application of gas to house heating manufactured and natural gas covering direct sales to customers, salesmen training and supervision, organization of department for sales, installation and service; development of rates and merchandising. Also industrial, distribution, construction and property management experience. **710.**

Sales manager—engineer thoroughly experienced manufactured, natural gas, and combination company sales promotion, merchandising, rate, publicity and utilization activities wishes connection with utility or manufacturer where more than nineteen years' training can be used to advantage as assistant to busy executive. **711.**

Sales representative. Experienced in all kind of house heating equipment, gas appliances and sales promotion or would consider representing a gas range or water heater company for the State of New Jersey and Eastern New York. **712.**

Sales engineer (B.S.) several years' practical plant experience in heat treating including supervision chemical and metallurgical laboratory large organization. Can specify materials, conduct research; wide personal acquaintanceship principal steel using industries metropolitan area. Knowing all available fuels could sell for gas company or manufacturer. **713.**

Manufacturing executive. Young, aggressive, reliable, graduate mechanical and industrial engineer. Experienced in production, development, design and sales. Radio, electrical, automobile accessory, air conditioning, heating and ventilating industry associations. Now connected with manufacturer as gas furnace sales manager. Especially adaptable to installation and supervision of scientific management methods of manufacture. **714.**

SERVICES OFFERED

Public relations. Fifteen years' experience in advertising and public utility field. Customer contact, employee education, coordination of advertising policy, appliance merchandising and dealer cooperative advertising. Experienced in trade relation problems, utility association procedure, and industry cooperative merchandising plans. **715.**

Experienced **sales** representative has valuable background of association with two important gas corporations. Has secured many unusual sales records and is thoroughly versed in appliance manufacturing as well as sales. Here is opportunity to connect with associate who can give not only loyal service but has exceptional business-getting capacity. **716.**

Manager and Operating **engineer** experienced in production, distribution and sale of manufactured, natural and mixed gases and in the holding company's methods of control over operating of subsidiaries. In position to go anywhere for permanent or temporary employment. **717.**

Budget director. Executive, engineering training, fifteen years' experience management gas and electric companies, qualified supervise preparation, operation, control of budgets. With practical background all branches gas electric industry, understanding financial requirements, able secure coordinated perspective for construction, operating and financial budgets. Can analyze costs, prepare explanatory reports on actual operations. **719.**

A gas **house heating** sales engineer with eight years' experience in the gas heating and industrial gas fields would like to locate with a gas company; services are available immediately. **720.**

Practical gas **distribution** man (40) married, with varied construction and sales experience, desires employment with organization offering future to one who is energetic and ambitious. Expects compensation commensurate with his accomplishments and the satisfactory results he knows he can obtain. **721.**

Sales director available for gas range manufacturer seeking wider markets. Advertiser has valuable contacts among all important gas range outlets, especially eastern territory. A successful record of sales and sales administration, backed by wide experience in manufacturing and general management insures accomplishments. Full particulars on file with Personnel Service. **722.**

Civil Engineer available for work anywhere in the United States. Recently superintendent on welded pipe line construction for New York company. Gas distribution systems, butane plants, consultant on pipe coatings and special pipe protection. River crossings a specialty. Age thirty-three. Married. **723.**

Sales and **merchandise manager,** with fullest appreciation of utilities' "public relations" problems. Familiar with floor and house-to-house sales; also employees' campaigns; and profitable use of home economics department. Successful organizer. Trained on plan, copy, display—both in major and smaller household appliance. Complete details on request. **724.**

Heating Engineer. Twelve years' experience, heating, ventilating, and plumbing engineering; designing, specifications and supervision. Industrial, commercial, school and residential air conditioning. College Graduate and licensed engineer New York and New Jersey. **725.**

Engineering graduate (1928, leading university). Will receive M.S. degree in Mech. Engr. (gas major) in June. Four years' of varied experience on maintenance and operation of city plants of large utility. Married; age 29. **726.**

Accountant (28) last two and one-half years with large combination gas and electric company handling all phases of public utility accounting; previously three years on public utility staff of C. P. A. organization. University graduate, majored in accounting. **727.**

SERVICES OFFERED

Contact man for manufacturer of gas equipment, or gas company, experienced in **gas heating** engineering and sales, both natural and manufactured gas. Can organize department and train men. **728.**

Management or **process development** work wanted. Have had responsible charge of large successful operating organizations. Particularly experienced in by-product coke, tar refining, and research. **729.**

Gas engineer qualified for company management or supervision of operating procedure; practical specialist in high and low temperature carbonization including preliminary research. First class technical background with extensive operating and managerial experience. As plant results engineer for large property or holding company, could secure and maintain maximum efficiency with present equipment. **730.**

Sales Executive: exceptional background, innumerable contacts, successful record merchandising gas, electric domestic, industrial service, appliances, training, and handling salesmen, advertising publicity, cost analyses, rate designing, public relations and general sales promotion; widely traveled expert negotiator, convincing personality, aggressive, tactful, creative, resourceful; can quickly visualize any situation and develop possibilities. **731.**

Qualifications arising out of eighteen years' broad auditing and **accounting** experience in varied lines including five years with large combination property, plus special courses in accountancy, at disposal of manufacturer of gas and electric equipment or gas and electric corporation. Public work has rounded out customary utility experience thus creating a more valuable asset. **732.**

Wanted to make connection as **Manufacturers Agent,** or with sales office, of concern manufacturing cast iron pipe and etc.; or kindred lines such as valves or similar appliances. Can furnish record and details of past experience in these lines. **733.**

Salesman—appliances. American. Keen merchandiser. Ten years' experience contacting public utilities, manufacturers, department and chain stores, real estate organizations, jobbers and retailers. Familiar sales promotion and missionary work and sales crews, house to house campaigns. (29) Single. Living Salary. **734.**

POSITIONS OPEN

Nationally known manufacturer of **water heaters** has available territory open. Would like applicants to forward qualifications, experience, etc. relative to same. **0256.**

Appliance **salesmen** preferably with utility experience, for new self-contained cooking device for restaurants, lunch rooms, soda fountains, road stands, etc. Desirable openings available in practically every State. Could easily be carried with other lines; commission basis. **0257.**

THOSE WHO HIRE

In these columns, and in the data sheets supporting the claims of each advertiser of his own services, you may find the means of lightening your labors. Personnel Service, from long experience, is equipped to provide lists of competent individuals in all lines; to function as your clearing house, to interview and prepare the "short list" for your inspection—it will also arrange interviews if desired.

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AMERICAN GAS ASSOCIATION, INC.

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